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TRANSACTIONS

OF

THE LIFE ASSURANCE MEDICAL OFFICERS' ASSOCIATION,

Owing to numerous unforeseen difficulties the issue of this volume of the Association's Transactions has been unavoidably delayed.

DINGS FOR

1900 & 1901.

LONDON,

1902.

TRANSACTIONS

OF

THE LIFE ASSURANCE MEDICAL OFFICERS' ASSOCIATION, LONDON,

COMPRISING THE REPORT OF THE PROCEEDINGS FOR

1900 & 1901.

LONDON,

1902.

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With Discussion by the President, Dr. Hingston Fox, Dr. Symes Thompson, Sir Douglas Powell, Dr. de Havilland Hall, Dr. Glover Lyon, Dr. Newton Pitt, and Sir Hugh Beevor.

Life Assurance Medical Officers' Association.

LONDON.

FOUNDED 1893.

Presidents of the Association:

ELECTED.

1893.—J. E. POLLOCK, M.D.
1895.—SIR RICHARD DOUGLAS-POWELL, BART., M.D.
1897.—SIR HERMANN WEBER, M.D.
1900.—C. THEODORE WILLIAMS, M.A., M.D.
1902.—G. VIVIAN POORE, M.D.

OFFICERS AND COUNCIL FOR 1900 AND 1901.

President: C. THEODORE WILLIAMS, M.D.

Vice-Presidents, 1900: G. VIVIAN POORE, M.D.; G. A. HERON, M.D., D.P.H.
,, *1901:* J. F. PAYNE, M.D.; F. DE HAVILLAND HALL, M.D.

Treasurer: G. A. HERON, M.D., D.P.H., 57, Harley Street, London, W.

Members of Council.

SIR HUGH BEEVOR, Bart., M.D.
SIR R. DOUGLAS-POWELL, Bart, M.D. (1900).
SIR DYCE DUCKWORTH, M.D., LL.D.
F. DE HAVILLAND HALL, M.D., (1900).
THOMAS HARRIS, M.D.
C. E. HOAR, M.D.
E. M. LIGHT, M.D. (1901)
T. GLOVER LYON, M.D.
F. G. PENROSE, M.D.
G. NEWTON PITT, M.D. (1901).
J. E. POLLOCK, M.D.
SIR HERMANN WEBER, M.D.

Hon. Secs:

HECTOR MACKENZIE, M.D., 34, Upper Brook Street, London, W.
ARTHUR DAVIES, M.D., 23, Finsbury Square, London, E.C.

LIST OF MEMBERS OF THE ASSOCIATION

REVISED TO DECEMBER, 1901.

ELECTED.

O.M.—ANDERSON, PROFESSOR MCCALL, M.D., Glasgow, Scottish Imperial (c. 1894-95).
1901.—BAGSHAWE, FREDERIC, M.A., M.D., St. Leonards-on-Sea.
O.M.—BALL, J. B., M.D., London, Rock.
O.M.—BARNES, FANCOURT, M.D., London, Prudential.
O.M.—BEEVOR, SIR HUGH R., Bart., M.D., London, Norwich Union. (c. 1898-1901).
O.M.—BISS, C. Y., M.A., M.D., London, Colonial Mutual.

ELECTED.

1896.—BLOXAM, J, ASTLEY, F.R.C.S., London, Clerical, Medical and General.
1900.—BROADBENT, SIR W. H., Bart., M.D., F.R.S., LL.D., Edin. and St. Andrews, London, Clerical, Medical and General.
O.M.—BROWN F. GORDON, M.R.C.S., London, Gresham.
O M.—BURNET, R. W., M.D., London, London Life. (c. 1894-98).

O.M.—CADDY, A., F.R.C.S., Calcutta. and the Oriental Club, London, W
1899.—CARRUTHERS, S. W., M.D., Mutual of New York.
1898.—CHAPLIN, ARNOLD, M.D., Marine and General.
1895.—CHAPMAN, C. W., M.D , London.
O.M.—COULTER, WILLIAM, M.D., Calcutta
O.M.—COURTNEY, G., M.D., Ramsgate.
1900.—CRIBB, A. W. GORDON, M.R.C.S., Orange, New South Wales.
1895.—CROSBY, HERBERT, M.A., M.D , London.
O.M.—CROSBY, ALDERMAN T. BOOR, M.D., London, Pelican, Scottish Provident, &c. (c. 1894-95, V.P. 1896, C. 1897.)

O.M.—DAVIES, ARTHUR T., M.D., London Westminster and General, North British and Mercantile (c. 1899, s. 1900-)
1899.—DAWSON, BERTRAND, M.D., Imperial.
1901.—DICKSON, J. H., M.A., M.B., London.
1896.—DUCKWORTH, SIR DYCE, M.D., LL.D., London, Law Life. (c. 1900-)

1895.—FINLAY, A., L.S.A., &c., London.
O.M.—FOX, T. COLCOTT, B.A., M.B., London, Mutual of New York. (c. 1897-98.)
O.M.—FOX, R. HINGSTON, M.D., London, United Kingdom Temperance. Friends' Provident. (c. 1896-99.)
O.M.—FRASER, PROFESSOR, T. R., M.D., F.R.S., Edinburgh, Standard.

O.M.—GLYNN, T. R., M.D., Liverpool, Royal.
1896.—GOULD, A. PEARCE, M.S., London, British Equitable.

O.M.—HALL, F. DE HAVILLAND, M.D., London, Rock. (c. 1894-1900.)
1894.—HARRIS, T., M.D., Manchester. (c. 1900- .)
1898.—HASLIP, G. E., M.D., D.P.H., London.
1898.—HAWKINS, F. M., M.D., London, Union.
1902.—HEANEY, FRANCIS J. S., M.B., Blackpool.
O.M.—HERON, G, A., M.D., D.P.H.. London, Mutual of Australasia. (c. 1894-99, V. P. 1900, T. 1900.)
O.M.—HOAR, C. E., M.D., Maidstone, United Kent. (c. 1896, V.P. 1897-98, c. 1898-1901.)
1898.—HOOLE, HENRY, M.D., London, Royal.
1896.—HOWITT, G. G., M.D. London, Colonial Mutual.
O.M.—HUGHES, R. H., M.A., M.D., Plymouth.

O.M.—JALLAND, W, H., F.R.C.S., York, Yorkshire Insurance Co.
1902—JOHNSON, HAROLD JOSSÉ, M.B., Gresham Insurance Co.
O.M.—JOHNSTON, J., M.D., London, Standard Life.

1901.—KELSON, W. H., M.D., London.
O.M.—KINGSBURY, GEORGE, C., M.A., M.D., Blackpool.
1898.—LIGHT, E. M., M.A., M.D., London, Prudential. (c 1901-)
1900.—LISTER, T. D., M.D., Royal Exchange.
O.M.—LITTLE, J. M.D., Dublin.
O.M.—LUBBOCK, M., M.D., London, Royal Exchange.
O.M.—LYON, T. GLOVER, M.A., M.D., London, National Mutual. (s. 1894-97, V.P. 1898-99, C. 1900-)
O.M.—MACKENZIE, HECTOR, M.A., M.D., London, British Empire. (c. 1894-95, s. 1896- .)
1898.—MADDICK, E. DISTIN, F.R.C.S.E., London.

ELECTED.

O.M.—MOLLOY, L. G., M.A., M.D., Blackpool.
O.M.—MOORE, W. M.D., Dublin, Standard.
1895.—MORRIS, MALCOLM, F.R.C.S.E., London, Ocean Accident.
O.M.—MUIRHEAD, C., M.D., Edinburgh, Scottish Widows. (c. 1899.)
O.M.—MURRAY, H. MONTAGUE, M.D., London, Guardian. (c. 1896-97.)

1895.—OLIVER, THOMAS, M.A., M.D., Newcastle-on-Tyne.
1899.—OWEN, ISAMBARD, M.D., Eagle.

O.M.—PAYNE, J. F., M.D., London, Economic. (c. 1898-99.)
O.M.—PENROSE, F. G., M.D., London, Westminster and General. (c. 1900-)
1899.—PIKE, THELWELL, M.D.
O.M.—PITT, G. NEWTON, M.A., M.D., London, Alliance. (c. 1894-95, 1901-)
O.M. · PLAYFAIR, J. M.D., Edinburgh, North British and Mercantile.
O.M.—POLLOCK, J. E., M.D., London, Imperial, London and Lancashire, &c. (P. 1894-95, C. 1896- .)
O.M.—POORE, G. VIVIAN, M.D., London, Law Union and Crown. (C. 1894-98, V.P.. 1899-1900.)
O.M.—POTTER, G. W., M.D., London, Scottish Metropolitan, London Assurance.
O.M.—POWELL, SIR R. DOUGLAS-, Bart., M.D., London, Clerical, Medical, and General. (V.P. 1894-95, P. 1896-97, C. 1898-1900.)

1899.—RABAGLIATI, A., M.D., Bradford, Friends' Provident.
O.M.—RANSOM, W. B., M.A., M.D., Nottingham.
O.M.—RISDON, W. E., M.D., London, Sun.
O.M.—RITCHIE, J., M.D., Edinburgh, Scottish Metropolitan.

O.M.—SHILLITOE, BUXTON, F.R.C.S., London, Atlas, London and Lancashire, &c.
O.M.—SINCLAIR, R., M.D., Dundee.
O.M.—STEPHENSON, F.L., M.B., Woolwich.
O.M.—STROTHER, W. H. H. M.R.C S., Sheerness.
O M.—SYMONDS, H. P., F.R.C.S., &c., Oxford.

O.M.—TAYLOR, SEYMOUR, M.D., London, Equitable.
1895.—TENNENT, GAVIN P., M.D., Glasgow, City of Glasgow.
O.M.—THIN, GEORGE, M.D., London, Marine and General.
O.M.—THOMPSON, E. SYMES, M.D., London, Equity and Law, Palatine, &c. (C. 1894-5, V.P. 1896.)
O.M.—THOMSON, P. J., M.R.C.S., L.R.C.P., Brussels.
1901.- TURNBULL, ALEXANDER, M.D., London, Scottish Widow's Fund.

1901.—WARD, A. OGIER, M.D., New York Life.
1899.—WEBER, F. PARKES, M.D., North British and Mercantile.
O.M.—WEBER, SIR HERMANN, M.D., London, North British and Mercantile. (V.P. 1897, P. 1898-99, C. 1900.)
O.M.—WEST, SAMUEL, M.A., M.D., London, Provident Clerks. (c. 1894-97.)
1894.—WILLETT, A., F.R.C.S., London. Provident Life.
O.M.—WILLIAMS, C. THEODORE, M.A., M.D., London, English and Scottish Law. (T. 1894-99, P. 1900.)
O.M.—WILLIS, JULIAN, M.R.C.S., London.

EXPLANATION OF ABBREVIATIONS.

O.M., Original Member.	V.P., Vice-President.
P., President	S. Secretary.
T., Treasurer.	C., Member of Council.

LIST OF LIFE ASSURANCE COMPANIES SUBSCRIBING TO THE PROCEEDINGS OF THE LIFE ASSURANCE MEDICAL OFFICERS' ASSOCIATION.

ATLAS.

BRITISH EMPIRE.
BRITISH EQUITABLE.

CITY OF GLASGOW.
CLERICAL, MEDICAL & GENERAL.
COLONIAL MUTUAL.
COMMERCIAL UNION.
CO-OPERATIVE.

EAGLE.
ECONOMIC.
ENGLISH & SCOTTISH LAW (2).
EQUITABLE.
EQUITY AND LAW.

GUARDIAN.

HAND IN HAND.

IMPERIAL.

LAW LIFE.
LAW UNION AND CROWN.
LIFE ASSOCIATION OF SCOTLAND.
LONDON AND LANCASHIRE.

MUTUAL OF AUSTRALASIA.
MUTUAL PROVIDENT OF AUSTRALASIA.
MUTUAL OF NEW YORK.

NATIONAL MUTUAL.
NATIONAL PROVIDENT.
NORTH BRITISH & MERCANTILE (2)
NORTHERN ASSURANCE.
NORWICH UNION.

PROVIDENT ASSOCIATION OF LONDON.
PROVIDENT LIFE.

ROCK (2)
ROYAL EXCHANGE.

SCOTTISH AMICABLE
SCOTTISH IMPERIAL.
SCOTTISH LIFE.
SCOTTISH METROPOLITAN.
SCOTTISH WIDOWS' FUND.
STANDARD.
STAR.
SUN.

UNITED KENT.
UNITED KINGDOM TEMPERANCE.

WESLEYAN AND GENERAL.
WESTMINSTER AND GENERAL.

YORKSHIRE.

RULES.

I.—Object.

The discussion of the Medical aspect of subjects connected with Life Assurance, with a view to obtaining increased information and greater unity of opinion.

II.—Constitution of the Association.

Ordinary Members, and a Council consisting of a President, two Vice-Presidents, two Secretaries, a Treasurer, and ten other Members.

III.—Qualification for Membership.

Candidates for membership must be legally qualified medical men. They must hold an appointment at a Life Assurance Office, or be recommended as eligible by the Council.

IV.—Election to the Membership.

Candidates for membership shall be proposed and seconded by Members, and shall be elected by ballot at the Ordinary Meetings of the Association.

V.—Election of Officers.

A list of Members recommended by the Council as Officers for the ensuing year, shall be sent to each Member of the Association one week before the last Meeting of the year, at which Meeting a ballot shall be held.

No one shall hold the office of President, or Vice-President, for more than two years consecutively; and two Members of the Council shall retire every year according to the vote of the Council.

VI.—Meetings of the Association and Council.

General Meetings shall be held on the first Wednesdays in January, March, May, and November, at 8.30 p.m., or at such other time as the Council shall arrange. The duration of the General Meeting shall be limited to one hour and a half, unless an extension be voted by the Members present.

The Council, of which four Members shall form a quorum, shall meet before each General Meeting, and may be called together at any time by the President and Secretaries.

VII.—Communications to the Association

Shall be approved by the President and Secretaries before they are brought before the Association.

VIII.—Transactions of the Association

Shall be published from time to time, consisting of the proceedings of the Society, together with other matter approved of by the Council.

IX.—Subscriptions.

One guinea, payable in advance on the 1st of January, annually in the case of Members residing in the London Postal district, and biennially in the case of other Members. Non-payment of subscription shall entail suspension of membership.

X.—Alteration in the Rules

May be made by a majority of two-thirds of a specially convened meeting.

Report of the Council for 1900 & 1901.

AT the beginning of 1900 the number of Members was ninety; at the end of 1901 it is eighty-eight. During the two years, eight new members have been elected, seven members have resigned, and three members have died.

The best thanks of the Association are due to Dr. C. Theodore Williams and to Dr. Heron for their services as President and Treasurer respectively during the last two years, and to the President, Dr. Poore, Dr. T. Glover Lyon, Dr. Hingston Fox, Dr. Colcott Fox, Dr. Carruthers, Sir Hugh Beevor, Dr. Parkes Weber and Dr. Lister, who have contributed the valuable communications which will be found among the published Transactions of the Association.

The various Meetings have been well attended, and many members have taken part in the discussions.

The last Meeting of 1901 took the form of a Dinner, which was held at the Grand Hotel, on December 11th, the President in the Chair, and was a very successful gathering. Invitations were sent in the name of the Association to a large number of Actuaries and Managers of Life Assurance Companies, of whom 32 accepted and were present, including the President, Vice-Presidents, Treasurer and Secretaries of the Institute of Actuaries. Forty members of the Association and four other guests, were present.

The financial position of the Society continues to be satisfactory.

FINANCIAL REPORT FOR 1901.

OF

The Life Assurance Medical Officers' Association.

Receipts.	£	s.	d.
Corrected Balance from 1900, as per Treasurer's Statemen dated Dec. 31st 1901	98	7	10
58 Members paid— 45 Town, 13 Country	76	13	0
44 Assurance Offices paid	47	5	0
14 Members paid through bank	14	3	6
2 copies "Proceedings" sold	0	5	0
4 Members paid twice	4	4	0
Three Members paid one guinea each ...	3	3	0
	£244	1	4

Expenditure.	£	s.	d.
Rent of Medical Society's Rooms	4	14	6
Refreshments	1	10	0
Shorthand Reporting	16	5	6
Printing "Proceedings," &c.	60	4	0
Book of Receipt Forms and Treasurer's Book	1	9	0
Multiplying Copies of Tables of Death Claims	1	9	10
Stamps	1	1	0
Dinner	39	6	9
Cigars and Cigarettes at dinner	5	10	8
Subscriptions returned to two Members who paid twice	2	2	0
Bank Charges	0	3	6
Balance	110	4	7
	£244	1	4

G. A. Heron, *Treasurer.*

February 12th, 1902.

Audited and found correct,

G. Newton Pitt
F. Parkes Weber } *Auditors*

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RACE IN RELATION TO LIFE ASSURANCE.

By **C. THEODORE WILLIAMS**, M.D., F.R.C.P.;
PRESIDENT;
Consulting Physician to the Hospital for Consumption and Diseases of the Chest, Brompton; Physician to the English and Scottish Law Life Assurance Association.

PRESIDENTIAL ADDRESS delivered to the Life Assurance Medical Officers' Association, February 7th, 1900.

GENTLEMEN,—I return you warm thanks for the distinguished honour you have conferred on me by electing me your President, an office rendered more honourable by my predecessors—Dr. Pollock, Sir Richard Douglas-Powell, and Sir Hermann Weber—who have all added to the prestige and dignity of the chair. I am proud to succeed Sir Hermann Weber, who is a physician long and intimately versed in insurance matters, and has a large and varied experience gleaned in many fields, which was well set forth in the interesting address he gave on taking this chair.

The progress of the Association has been slow but sure. Our present rules prevent our attaining to large numbers of members, as we limit our membership to medical men holding an appointment at a Life Assurance Office, or recommended as eligible by the Council, but as we stand, we include medical representatives of the principal Insurance Companies in England and Scotland, who can contribute plenty of valuable experience on the moot points of Life Assurance, and thus make our papers and discussions highly important, while we issue to the Insurance Companies for a moderate subscription copies of our Proceedings, and thus spread our conclusions and reasoning among those who most appreciate them. As the number of companies who thus subscribe is an increasing one, and it is evident on all sides that the Proceedings are valued, we should do well to devote our principal efforts to rendering them as useful as possible. In the first place, the report

of each paper and discussion might conclude with a bibliography of the subject; then we should not grudge money for tables or diagrams in illustration; and finally, we should try to raise the subjects treated out of the region of guess, in which many knotty points of Insurance remain, into the region of scientific knowledge. Our Proceedings, which will, I hope, soon become, by the process of evolution, Transactions, will then be a valuable addition to the literature, both of Medicine and of Life Assurance, and fully justify our existence as a society.

For the editing of these Proceedings, a work of no little labour, we are indebted to our indefatigable Secretary, Dr. Hector Mackenzie, as we were formerly to the former enterprising Secretary, Dr. Glover Lyon.

I have said that unless our rules are changed and we admit all medical men interested in Insurance, we can never form a large Society, but it is a question whether we should not act more in accordance with the spirit of the times if we removed restrictions and refused as members no fully qualified medical men who have relations with Insurance work.

During the past year we have had some excellent and practical papers by Dr. Symes Thompson, Dr. Heron, Dr. Harris of Manchester, and Sir Dyce Duckworth, all of which have been followed by good discussions, in the case of Dr. Heron's paper lasting two nights.

But while we have discussed many questions since the formation of the Association in 1894, some imperfectly, and some more or less completely, we must bear in mind that there are many others ripe for discussion. Obesity is one of these, for we are daily confronted with the difficulty of what is to be done with a man or woman who apparently is healthy and whose organs are pronounced sound, but who happens to accumulate an undue amount of adipose tissue in his or her body. Are we to charge an extra or not, and, if so, what? The question of extras to be charged for residence in certain climates, specially in tropical or malarious, has never been scientifically treated, and the rules acted on by the various offices are often simply the experience of one office, and not—as they ought

to be—the outcome of the united experience of all the offices. Such a question might well be handled by this Association.

This is another subject which has not hitherto been discussed by the Association, and on which I propose to say a few words to-night, viz., the circumstance of race in connexion with the expectation of length of life.

What do we know of the relative expectation of life for a German, a Frenchman, an Englishman, or an Italian; or, to come nearer home, what difference of expectation is there for an Englishman, a Scotchman, or an Irishman?

Again, are the inhabitants of the United States longer lived than ourselves?

Many Insurance Offices, notably the American, have Continental branches, and insure lives of various nationalities other than British or American; and the question arises, On what facts do they rely in the selection of such lives?

The English and Scottish Law Life Assurance Association, of which I am the Chief Medical Officer, has a branch at Hamburg, which appears to be popular with the Germans; and another branch at Stockholm for the Swedes and Norwegians; and when the reports from these places come in, my difficulty has always been to determine, apart from anything in the individual report, what the value of a standard German or Scandinavian life may be, and, generally speaking, the life has been considered like that of an English man or woman, and the rates charged accordingly. But as I have insisted to the members of the Actuarial Staff, we have no valid reason for thus acting, and proper facts to guide our decisions ought to be forthcoming. Anyone, with even a superficial knowledge of the Continent, must see that there is much in the life of a German, a Frenchman, or an Italian of the upper, middle, or insurable classes, which differs from that of an Englishman.

Take a Frenchman, for instance, living, where they all love to live, in Paris, and occupied with some kind of business or profession. He rises early, has his *café au lait* and a roll, and goes to his *bureau*, returning at 11 or 12 for his *déjeûner à la fourchette*, which is nothing less than an elaborate early dinner, washed down with a

bottle of claret or burgundy, and ending in coffee and cigarettes, occupying at least an hour. Then, at some time between six and eight, our friend has a late dinner, only differing from the mid-day one in the addition of soup, and, perhaps, an extra course besides, and accompanied by the same amount of wine. After leaving his office, he spends his time in a promenade or in calling, but more generally at a *café*, and he is certainly not addicted to exercise in any form. A Frenchman does not as a rule drink spirits, except a little after meals, but takes freely of wine. He smokes, but not excessively. With regard to meals, our Gallic friend does not make many, but his food is abundant, well cooked, and varied—more vegetables are introduced than into our English bill of fare. Under this *régime* he generally becomes stout, and the old epithet, a "skinny Frenchman," is no longer applicable, as both French men and women are more inclined to *embonpoint* than our country people. Another point about the French is that they do not maintain the daily, regular action of the bowels: therefore, constipation is common, and an accumulation of fæces is either relieved by strong purges, or by purgative enemata, on which many French men and women entirely depend.

Then take the life of the German professional or commercial man. He rises between six and seven, takes *café au lait*, black bread, or roll and butter, and goes to his *bureau* till between one and three, when he devotes an hour to his dinner, a serious and heavy meal, less elaborate than the Frenchman's, and of which vegetables, including, in winter, *Sauerkraut*, form a great feature, but combining plenty of meat and invariably sweets. This is accompanied by wine or light ale. After the meal he generally has coffee and returns to his duties.

Between seven and 8.30 p.m. comes supper, consisting of cold meats, with probably one hot dish, sausages, and bread and butter, and washed down by either weak tea or—in the case of men—more often by beer; or in the larger towns a rather earlier second dinner may replace this supper.

The Teuton eats largely, but his chief characteristic is the quantity of beer he takes. He drinks light wines, but not to the

same extent as beer. The drinking not only accompanies meals, but generally follows them, and often forms a refreshing link between them, and the amount consumed of this good but weak ale, which is of the lager description and contains little alcohol, is astonishing. He does not take much spirits, but is a great smoker and loves his pipe, carrying on the practice late and early, with beer drinking and without.

The Germans are fond of exercise. The young men belong to gymnasia *(Turnvereins)* and they are also great walkers and fond of tours, on foot or on bicycles, but they are not so much given to games and sports as we English. Germans like, when possible, to take a course of baths, mineral or salt, in summer or autumn.

The Italians' mode of life is rather more difficult to describe, especially as the North Italian differs greatly in race and in habits from the Southern, who is more or less Greek, while in the Northern, and especially the Lombard and Venetian, there is some German admixture; and in the Piedmontese, some French.

But the usual habits of the insuring classes in Italy—in which I need not say that the picturesque *contadini* and *lazzaroni* are not included—is an early, light repast of *café au lait* or chocolate, and a solid meal between 10 and 12, resembling the French *déjeûner*, but the cooking of which is less choice, and in which oil figures largely.

Rice, macaroni, and vegetables are freely used, and the meat is inferior to the French or German. The dinner resembles the French in number of courses, with the same reservations.

The Italian drinks his own sound wines and smokes many cigarettes, but neither to excess. He differs from Northern races in taking his *siesta* for two hours in the middle of the day, during which period all active business is suspended, and, perhaps in consequence, he sits up late at night. He takes but little exercise, and is, unfortunately, rather dirty in his habits, and seldom presents the appearance of great vigour. With regard to the atmosphere of the dwelling, whereas the Germans, and even the French, live in houses warmed to a higher temperature by stoves and *Calorifères* than the English with open grates, in Italy the homes are kept colder, and specially in the South, where they are devoid of heating apparatus,

except the sun and, occasionally, the unwholesome charcoal *scaldino.*

The habits of the Englishman, whom we insure, are well known to us all, and it will not be necessary to go into details, but some leading features are that he is a breakfast-eater, *i.e.*, breaks the long fast of the night properly by a solid meat breakfast; takes a moderate lunch and a good late dinner; or, among certain commercial classes, an early dinner and a substantial supper. His dietary is simple, with a predominance of meat, generally of the best kind; vegetables and salads, the preparation of which is rarely understood here, are comparatively scarce. His liquors are of a more potent character than those of his foreign neighbours; his ales are brewed stronger, his wine is more fiery. He drinks sherry, and occasionally port, and too often spirits; though it is true claret and light wines are of late years more in vogue. But with all this, he does not make so much of his meals as the Frenchman or the German. He smokes to a less extent than either, and takes abundant exercise; and is very fond of games, such as cricket, football, golf, and tennis; loves hunting and shooting when he can get them, and at any rate riding and cycling; and with regard to athletics is an enthusiast. He is clean in his habits, and partial to bathing of all sorts, from the matutinal tub to the swim in the sea, and professes to be unable to exist without plenty of fresh air; and in the country, as a rule, he does try to pursue an open-air life; but in towns his practice does not always come up to this theory!

Such being the habits and surroundings of these nationalities, let us see from the—alas!—scanty materials at our disposal, how their lives are thereby affected. I would first draw your attention to Table I., which is based on Table 44 of the Registrar-General's Report for 1897, in which Dr. Tatham has placed the number of deaths per 1000 living for 25 years in as many European states as he could collect statistics of.

The original table comprises 26 years' death-rates, but in order to include the German Empire mortality, which is only complete for 25 years, I have only made use of that number of years. The table shows (i.) the deaths in 1872 in each country; (ii.) the average mortality for the 25 years; and (iii.) the change, and

generally the declension at the close of that period. It may be remembered that some years the death-rate rises considerably from epidemics, such as cholera; also from war, floods, and such catastrophes.

The United Kingdom rate was not high 25 years ago, being 20·9, but has gradually fallen to 17·7. England and Wales together,

TABLE I.

DEATHS PER 1000 OF POPULATION IN EUROPEAN STATES.

STATES.	AVERAGE 25 YEARS.	1872.	1881.	1891.	1897.
United Kingdom	19·6	20·9	18·7	20·	17·7
England and Wales ..	19·8	21·3	18·9	20·2	17·4
Scotland	20·	22·3	19·3	20·7	18·7
Ireland	18·1	18·1	17·5	18·4	18·4
Denmark	18·8	18·4	18·3	20·	16·6
Norway	16·8	16·6	16·8	17·5	15·4
Sweden	17·3	16·3	17.7	16·8	
Austria	29·9	32·7	30·6	28·2	25·6
Hungary	35·4	42·3	34·4	33·1	28·4
Switzerland	21·7	22·3	22·6	20·6	18·3
German Empire	25·2	29·	25·5	23·4	21·3
Prussia	24·9	29·3	24·9	22·9	20·9
Netherlands	21·8	25·9	21·5	20·7	16·9
Belgium	21·	23·2	20·9	21·	17·2
France	22·6	22·	22·	22·6	19·6
Italy	27·8	30·	27·6	26·2	22·1

and Scotland, have both fallen, but, on the other hand, in Ireland the rate, roughly speaking, is the same as it was 25 years ago.

Denmark, Norway, and Sweden have had, and still maintain, a remarkably low death-rate. In Denmark and Norway there has been a fall, and the latter appears to possess the lowest death-rate in Europe.

Denmark's is also low, though containing at least one large city

(Copenhagen), which is not to be regarded in her favour. In Norway and Sweden the low rate may be attributed in some degree to the sparseness of the population and absence of crowding, even in the few large cities.

In Austria the death-rate was high—32·9; and has been reduced to 25·6.

In Hungary it was 42·3—the highest in the table—and has come down to 28·4.

Curiously, the next on our list, Switzerland, has by no means a high rate—22·3—but which has not diminished to our level or to that of Norway and Sweden.

The German Empire's rate has come down from 29 to 21·3, and the Kingdom of Prussia from 29·3 to 20·9, but it is surprising considering the enlightenment of the German nation and the arbitrary powers possessed by their government, that this rate has not been more reduced.

The Netherlands, though with many difficulties as regards position and drainage, have reduced theirs from 25·9 to 16·9; and Belgium, a manufacturing and densely-inhabited country, from 23·2 to 17·2. Coming to the French, we find a reduction from 22 to 19·6, hardly enough in 25 years; but the Italians have done well to change their rate from 30·7 to 23·1 in the same time. Therefore, we see that Norway and Sweden, with their sparse population, come first; then little Denmark, then Holland and Belgium, and close on the heels of the latter, and first of the great powers, comes the United Kingdom, then France after an interval, then the German Empire, then Italy, then Austria, and last of all Hungary.

It is interesting to note what an enormous reduction in the death-rate has occurred in most countries; and it is comforting to reflect, that of the countries with large town populations we stand first in the lowness of death-rate.

Italy is better than we could have expected, and Austria worse. My knowledge of Hungary is too limited to enable me to offer any explanation of its high death-rate.

The death-rate only affords us limited information as to the expectation of life, for it includes all classes, of which the working-

class is far the most numerous, and the insurable class constitutes but a small fraction. But now we will see what the experience of British and Foreign Insurance Offices can supply on the subject.

The annexed Table II. is extracted from the elaborate Tables of

TABLE II.

RESULTS OF INSURANCE OFFICES COMPARED.—COMPLETE EXPECTATION OF LIFE.

AGE.	AMERICAN.	BRITISH. (H.M. 20 Offices.)	GERMAN. (23 Offices.)	FRENCH.
20	42·199	42·101	39·683	41·839
25	38·806	38·382	36·401	38·193
30	35·332	34·726	32·886	34·382
35	31·784	31·051	29·329	30·584
40	28·177	27·389	25·798	26·833
45	24·537	23·778	22·345	23·175
50	20·912	20·271	18·964	19·659
55	17·400	16·926	15·770	16·344
60	14·098	13·808	12·848	13·287

Mortality, published by the Comité des Compagnies d'Assurance in 1895, and compares the results in expectation of life published by the American Companies in 1868, by the Institute of Actuaries in 1869, by the 23 German Offices in 1883, and the French Assured Lives Report of 1892.

In all these offices, except the French, the figures are for the male sex only; the French are for both sexes. The figures have been corrected according to Makeham's formula, and are as good statistics as I can procure on the subject. It appears from this table that at age 20 and upwards the American expectation is slightly better than the British, but there is no great difference; then, with about the same interval, comes the French; and, lastly, the German, which is decidedly below the French, and still more so below the British and American. Mr. G. F. Hardy, the Consulting Actuary to the English and Scottish Law Life Assurance Association, in a paper on "The Mortality Experience of Assured Lives and

Annuitants in France," published in the journal of the Institute of Actuaries, of January, 1898, makes an interesting comparison of the male French assured lives with the H.$^{M.}$ Tables, and the female assured lives with the H.$^{F.}$ Tables, with the result that among the male lives there is a difference in favour of the British, which at the age of 25 is ·37 of a year, and rises to a maximum at age 50 of nearly one year, and then diminishes almost uniformly to the end of life.

On the other hand, Mr. Hardy found a somewhat lighter mortality among the French female assured lives than among the British.

Mr. Spencer, of the English and Scottish Law Life, has kindly prepared the subjoined Table III., comparing the annuity experi-

TABLE III.

ANNUITY EXPERIENCE, 1863-93.—COMPLETE EXPECTATION OF LIFE.

AGE.	BRITISH.		FRENCH.	
	MALES.	FEMALES.	MALES.	FEMALES.
50	20·88	24·25	20·62	23·47
55	17·88	20·67	17·50	19·88
60	14·77	16·98	14·35	16·24
65	11·92	13·54	11·46	12·89
70	9·30	10·51	8·81	9·88
75	7·03	7·81	6·68	7·40
80	5·21	5·67	4·90	5·40
85	3·85	4·11	3·70	4·11

ence of the French and British Offices for males and females of 50 and upwards. This is the latest contribution from the French Offices, and can be thoroughly relied upon; and this comes out in favour of the British annuitants, slightly in favour of the males, and rather more in favour of the females.

What, however, strikes one most is the much higher expectation for females than for males after the age of 50.

These tables and figures are fragmentary, and there is a great deal more to be learnt on this subject; but putting the results of the three tables together, we can hardly doubt that the British life has a slightly better expectation than the French or the German; and it appears that the American's expectation is the best of all. It should be remembered that annuitants are a picked class of the community.

A later contribution from 30 American Offices brings out this feature more decidedly.

I have not gone into the question of the American's habits and life, because they greatly resemble our own, with a few modifications, due partly to the climate of the United States. They consume more tobacco than we do, and, as a rule, do not take alcohol with their meals, only iced water and weak tea, but they take alcohol in the form of beer and cocktails between meals, and hot cakes and candies may be reckoned among their dietetic vices! They are great fruit eaters. They live at a higher temperature than we do, and in winter their houses, waiting rooms, and railway carriages are heated to a far greater degree than ours.

As some London Offices insure native Indian lives, I thought it might be interesting to know what was their practice and what results followed. At my request, Dr. Pollock made enquiries at one of his offices, the London and Lancashire, and kindly sent me the following information :—

"Native lives there pay an addition to the ordinary whole life premium of 15s. to £1, in fact, the same rate as Europeans in India. The results have as yet not been tabulated, but are quite within the expectation. A Calcutta Board refers all doubtful cases to the Home Board, and they come to the Chief Medical Adviser. The claims chiefly arise from climatic causes, such as malaria, dysentery, also from pneumonia. Phthisis rarely appears on the list. Intemperance is not noticeable, except for its absence. The class insured belongs to the official or legal. The business, on the whole, is considered to be paying."

It must be admitted that Dr. Pollock's pithy note contains a great deal of information, and encourages me to apply to other offices for their results among the Eastern races.

As regards negro expectations, I have had my attention drawn by the officials of the New York Mutual to some interesting statistics of Mr. F. L. Hoffman* demonstrating the excessive mortality of the negro race in the United States, and that this has been on the increase since their emancipation.

The contrast between the expectation of life in white and coloured races is shown well in the subjoined table, giving the 1880 census results of four large cities, which, as Mr. Hoffman remarks, are very striking :—

TABLE IV.

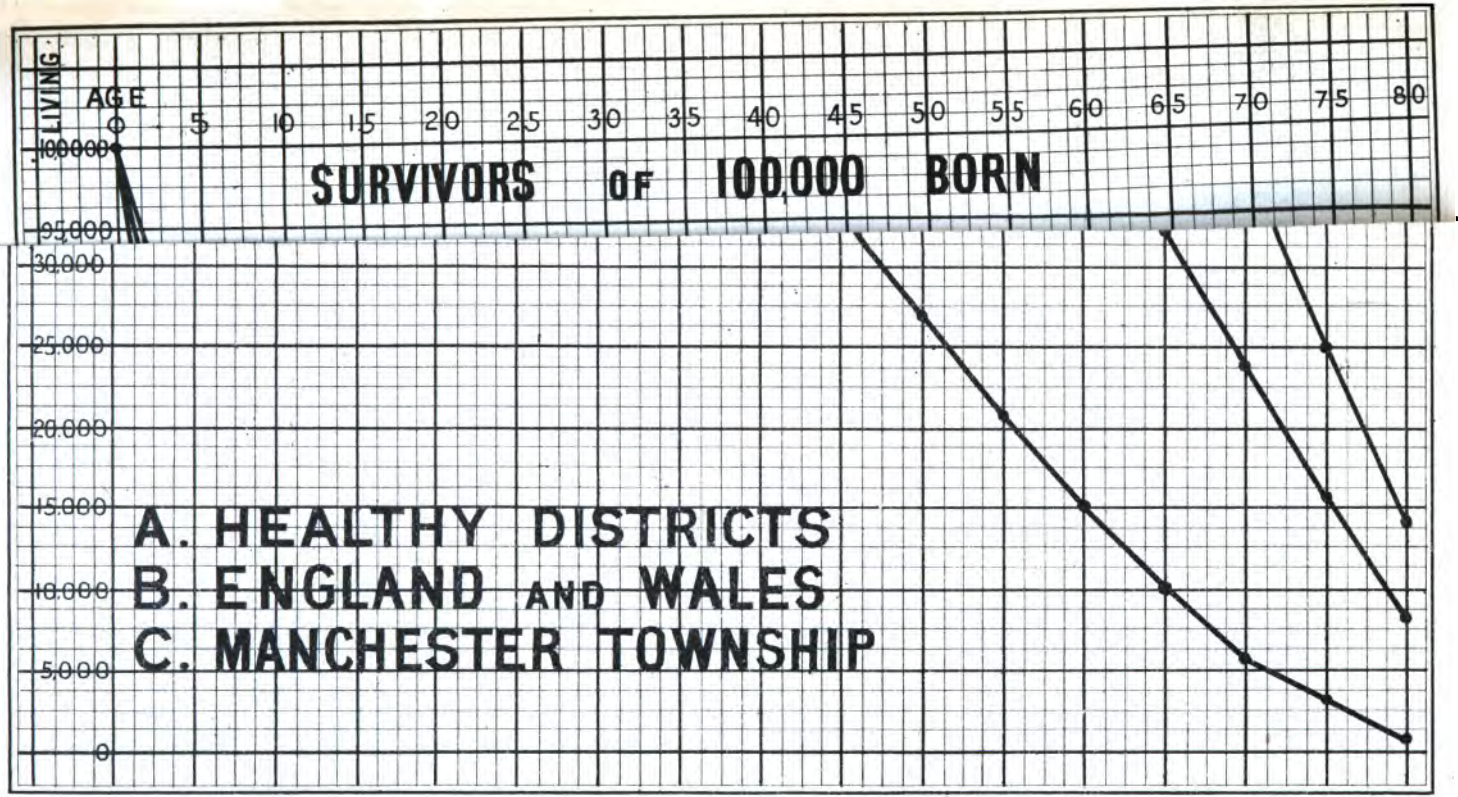
Ages.	Washington, D.C.		Baltimore.		Charleston.		New Orleans.	
	Whites. Years.	Coloured. Years.	Whites. Years.	Coloured. Years.	Whites. Years.	Coloured. Years.	Whites. Years.	Coloured. Years.
5	..	..	..	..	..	..	..	..
10	51·85	44·48	51·72	44·32	48·10	40·68	47·88	40·76
20	48·71	42·13	49·66	42·40	44·24	37·96	44·16	37·50
30	33·64	30·22	34·74	30·64	30·08	27·14	29·35	26·98
40	27·36	24·63	28·05	24·68	24·60	21·51	23·78	22·49
50	21·06	18·90	21·27	18·92	18·80	15·72	18·62	17·78
60	15·01	13·70	15·01	13·42	13·14	11·04	13·58	13·22
70	9·98	9·19	10·24	8·87	8·81	7·90	9·43	8·98
80	6·70	6·37	7·14	6·38	6·59	5·94	6·73	6·46

"In the district of Columbia (Washington) a white person, at the age of 30 for instance, would have a chance of living about 3½ years longer than a coloured one of the same age; in Baltimore about 4 years; and in New Orleans about 2⅓ years. But this is an age at which the general mortality is very low for both races. At all the earlier ages the differences are of course much greater."

One would like to know if any facts are forthcoming about

* "Race Traits and Tendencies of the American Negro." 1896.

Chinese and Japanese lives, and whether our own colonists, say, in Australia and Canada, are better risks than ourselves. However, while speculation is endless, facts are not so; and it behoves me to stop for the present at this point, trusting that, while my information is only fragmentary, I have been able to demonstrate to you the importance of the enquiry into race, and to stimulate all of us to collect sufficient facts to enable us to form conclusions of scientific value.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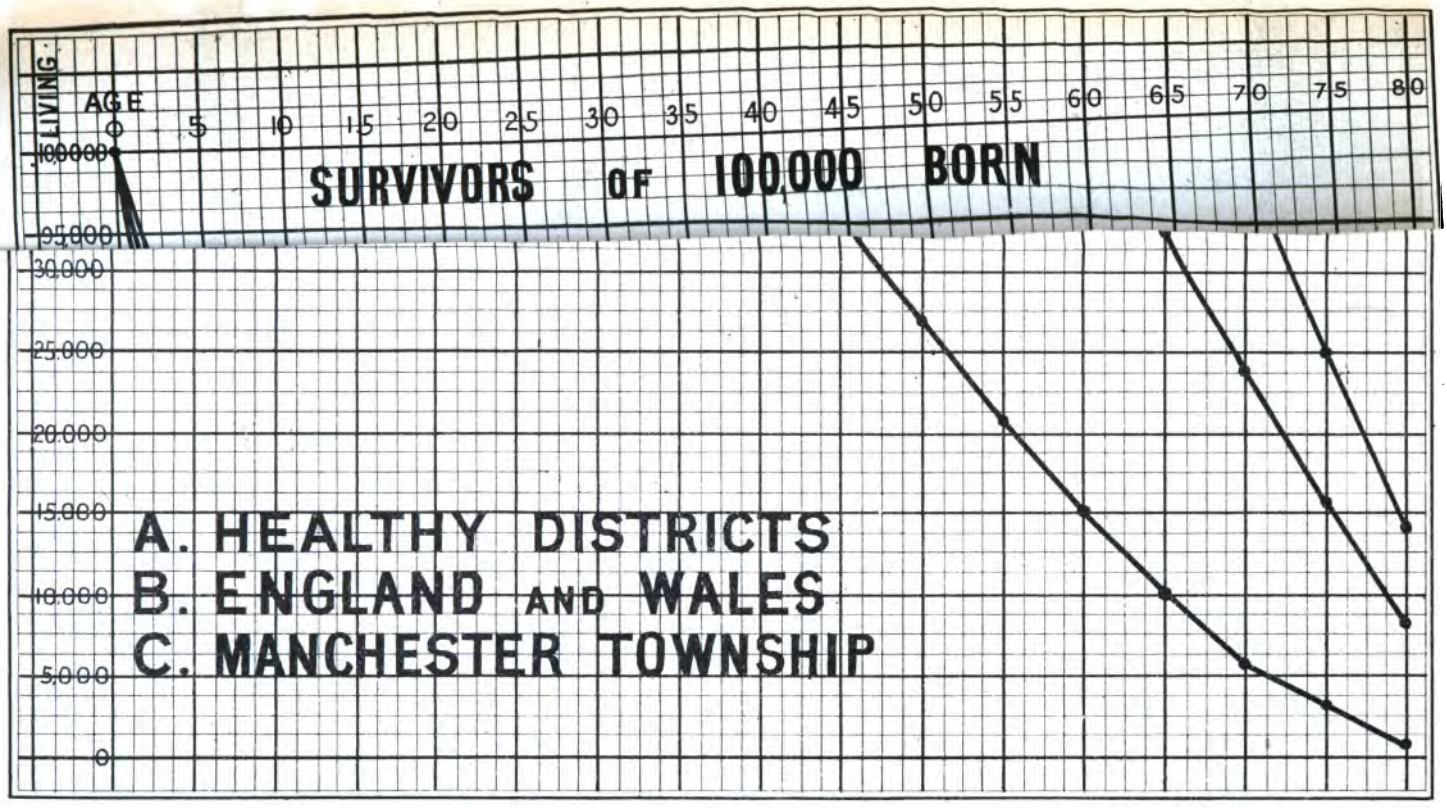
B. ENGLAND AND WALES
C. MANCHESTER TOWNSHIP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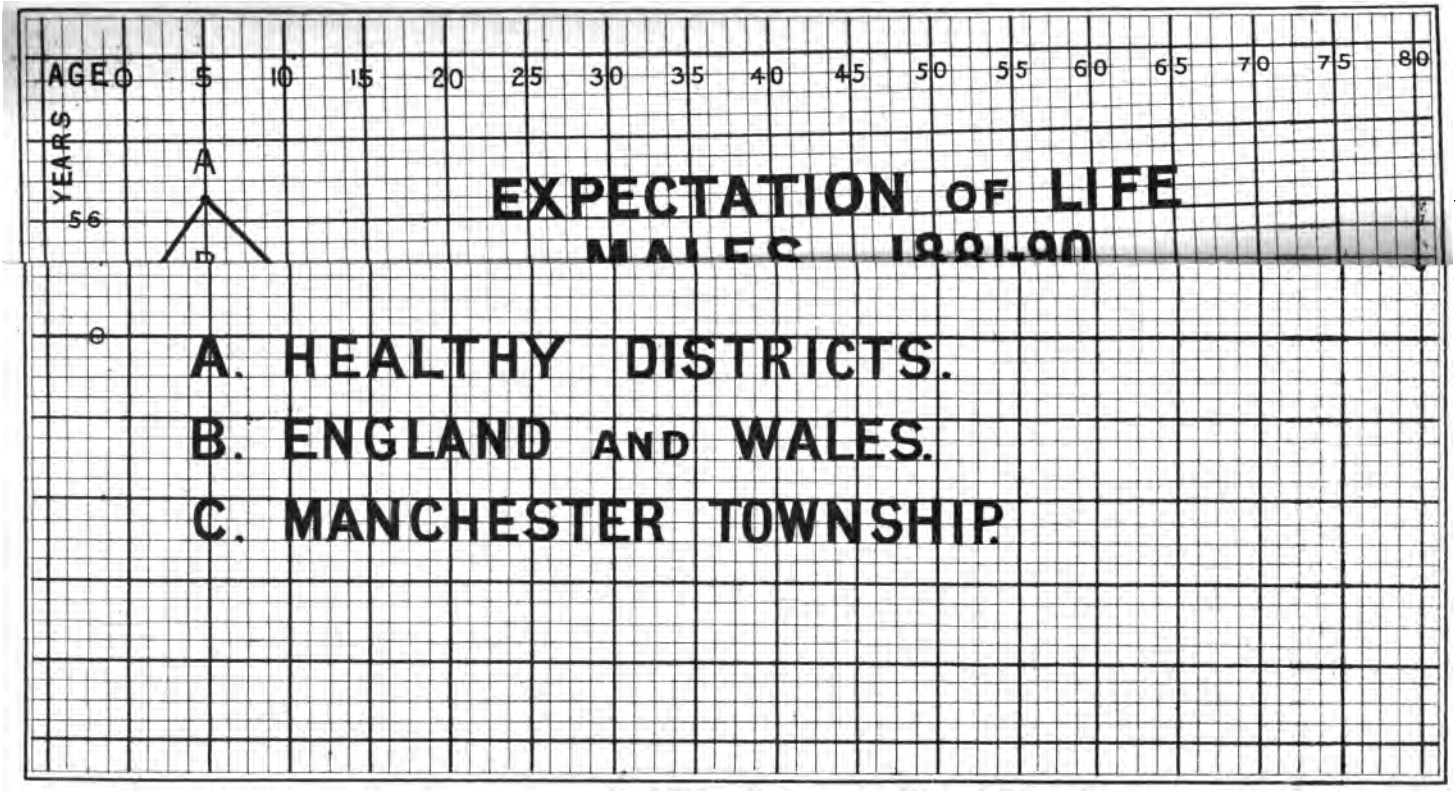
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MALES 1881-90
A. HEALTHY DISTRICTS.
B. ENGLAND AND WALES.
C. MANCHESTER TOWNSHIP.

LOCALITY AND OCCUPATION IN RELATION TO LIFE ASSURANCE.

By **G. V. POORE**, M.D., F.R.C.P.;
Physician to University College Hospital and to Law Union and Crown Assurance Company.

Read before the Life Assurance Medical Officers' Association, March 7th, 1900.

C. THEODORE WILLIAMS, M.D., *President in the Chair.*

The short paper which I have the honour of reading to-night is based entirely, or almost entirely, upon the two volumes which constitute the supplement to the fifty-fifth Report of the Registrar-General. For these volumes we are indebted to Dr. Tatham, and I hope that, in bringing to your notice certain facts contained in them which seem to have very special bearing upon our professional duties in relation to Life Assurance, I may make no unwarrantable use of the immense mass of statistical information which these two volumes contain.

In Life Assurance practice we are constantly called upon to recommend additions to the premium, on the grounds of defects in family or personal history. Many of the communications which have been made to our Society have dealt with the subject, and in the discussions which have followed, it has been evident that in making additions there is abundant scope for individual opinion, and that the accident, so to say, of individual experience is very apt to tinge our policy in this matter.

The statistical information with which I am about to deal is open to no such objection, and the facts which I shall bring before you may reasonably be regarded as facts which are capable of wide application.

The decennial supplements of the Registrar-General are founded on the figures, not of one year, but of a decennium, and the estimates

of population, being taken as the mean of two census returns, may be accepted as accurate.

Locality.

Dealing in the first place with locality, I will begin by calling your attention to two diagrams which I have constructed from tables given in the second part of the supplement.

The first diagram shows (*see* Table 1) the survivors at each quinquennium of life out of 100,000 males born in 1881-90 (*a*) in selected healthy districts; (*b*) in England and Wales as a whole; and (*c*) in Manchester township. The second diagram (*see* Table 2) is constructed from the life tables for these three districts, and shows at a glance the different expectations of life in each of the localities dealt with. I may here parenthetically remark that in this paper I deal exclusively with males, as being the sex with which, as Life Assurance officers, we are mainly concerned. I need hardly remind our Society that the mortality of males is, at all ages, greater than that of females.

These diagrams show at a glance how much more rapid is the waste of life in the Manchester township than in the selected healthy districts (*i.e.*, 263 districts with a population of 4,606,503 persons which had death-rates below 15 per 1000 in 1881-90). The Manchester "township" includes the older and more crowded parts of the city, and in comparing these life tables we are making comparison of the best health conditions obtainable in the country with the worst.

The number of children dying under the age of five is well shown in the first table. Out of 100,000 male children born, 17,314 succumb in the first five years in the healthy districts, and 37,674 in the Manchester township. The infant mortality of Manchester is thus seen to be 118 per cent. in excess of the healthy districts.

These diagrams speak for themselves, and need no lengthy description, but they seem to me to bring home certain facts more promptly and forcibly than do the columns of figures from which they have been constructed.

The fact that the expectation of life is greater at five years of age than it is at birth is at once apparent, and the relative expectation at any age in either of the three districts is evident at a glance.

The diagrams also bring out another fact, which beginners in Life Assurance do not always appreciate, viz., that an addition of years to a life, which may be inadequate for a young man, may be excessive for an older one.

Thus the expectation of life of a young man of 20 is (omitting fractions) 44 years in a healthy district and only 29 years in Manchester (15 years of difference). At the age of 40 the healthy district male still has 29 years of expectation, and the Manchester man only 17 (12 years of difference). At 56 the healthy district male still has 17 years of expectation, and the Manchester man only 10 (seven years of difference). At 67 the healthy district male has 10 years of expectation, and the Manchester man nearly seven (three years of difference). At 77 the difference in expectation is a little more than a year, while at 87 the dweller in the Manchester township has ·38 years expectation more than the dweller in the selected healthy district. This last fact, which at first sight is paradoxical, tends to show that the man who reaches 87 in Manchester must be a singularly tough specimen of humanity.

The lines of the diagrams, which tend generally to converge as life advances, bring these facts very forcibly to the eye.

These tables show, what has long been recognised, that mortality is proportionate to density of population, and they show that the extra risk of dying shadows the man who works and lives in a crowded city through the whole working period of life.

When we come to compare the relative mortality of smaller aggregates of population for which no life tables have been constructed, it becomes very difficult to arrive at a reliable conclusion.

It seems to be very generally admitted that the comparison of crude death-rates of localities, without correcting them for peculiarities of age and sex distribution, is worthless. No less important is the correction which must be made for deaths in public institutions, which tend steadily to increase. More than a quarter of the total deaths in London occur in public institutions. These

institutions may unduly raise the mortality of the district in which they happen to be, and it is now common to avoid the error by an equitable distribution of deaths occurring in institutions. On the other hand, it is notorious that a large proportion of those whose health is undermined by living and working in a densely-populated city leave it to die elsewhere.

I am of opinion that, while the study of the three life tables is most instructive, not much instruction is to be got by comparing smaller aggregates of population. In the Registrar's decennial supplement, however, the death-rates of districts are given "in standard population," *i.e.*, after the necessary correction for age and sex distribution, and for different age periods. That being the case, I am tempted to send round a table of death-rates for males in 1881-90 at four age periods for

a. England and Wales.
b. Burton-on-Trent—the metropolis of beer.
c. Warrington—a manufacturing town, having a population about equal to Burton.
d. The Strand—the centre of the biggest city in the world.
e. Wantage—a rural town, on the edge of the Berkshire Downs.

TABLE III.

MALE DEATH-RATES PER 1000 LIVING, 1881—90.

Age.	England.	Burton.	Warrington.	Strand.	Wantage.
25	7·73	7·66	7·20	16·59	5·17
35	12·35	12·43	12·80	28·00	8·19
45	19·28	19·04	22·00	44·85	13·79
55	34·66	35·89	40·19	58·52	25·04
Deaths under one year to 1000 births.	155	138	160	244	111

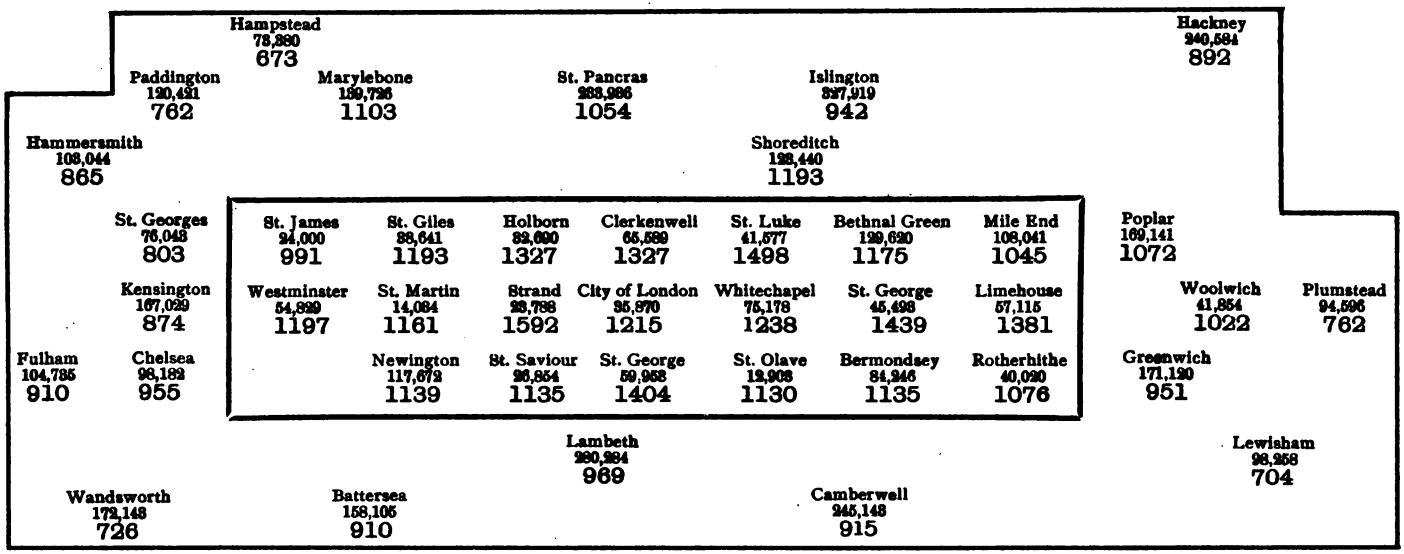
One interesting feature in the above table is the fact that the health of Burton-on-Trent is as good as that of the rest of England,

TABLE IV.

MORTALITY FIGURES.

(Figures in small type show the population of the Sanitary Areas.)

ENGLAND AND WALES = 860. 1893. LONDON (entire) = 1000



DR = Corrected Death Rate. MF = Mortality Figures.

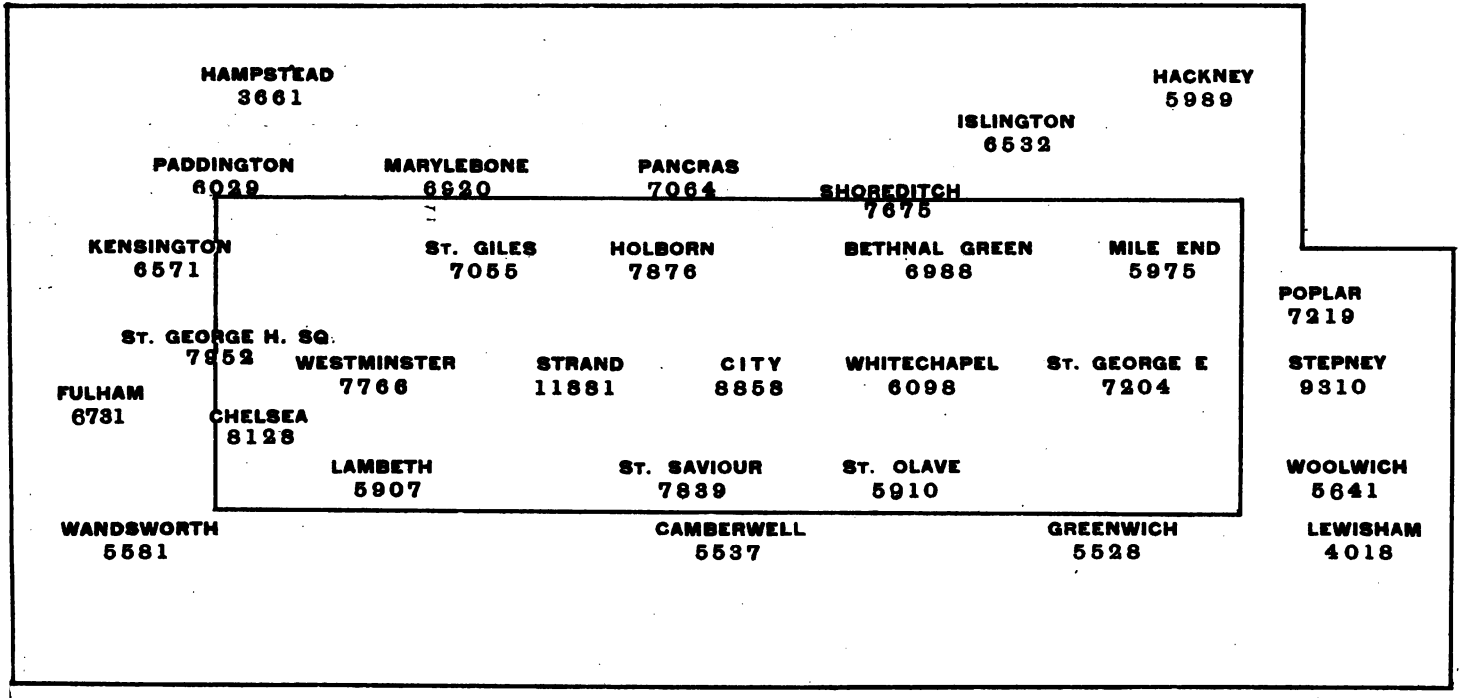
	DR	MF
Hampstead	14·2	657
Lewisham ... ... / Plumstead	15·7	727
Wandsworth	16·8	778
Hackney	18·1	838
England & Wales	**19·0**	**860**
Paddington ... ... / St. George's, Hanover Square...	19·3	894
Battersea ... ... / Kensington	19·4	898
Greenwich	19·7	912
Camberwell	19·9	921
Islington...	20·1	931
St. James's, W. ...	20·2	935
Lambeth...	20·7	958
Hammersmith ...	20·8	963
Fulham	20·9	968

1892.

	DR	MF
London (entire)...	**21·6**	**1000**
Chelsea...	22·0	1019
Rotherhithe	22·2	1028
Woolwich	22·8	1056
Poplar...	23·2	1074
St. Marylebone... ...	23·4	1083
St. Pancras	23·5	1088
Mile End	23·8	1102
Shoreditch	23·9	1106
Bethnal Green ...	24·1	1115
Bermondsey... ...	24·3	1125
City of London ...	25·3	1171
Newington	25·5	1181
St. Giles...	26·2	1213
Westminster... ...	26·6	1231
St. Saviour, Southwark ... ... / Whitechapel... ...	26·7	1236
Whitechapel... ...	26·8	1241
Clerkenwell ... ... / St.George's, Southwark	27·5	1273
Limehouse	27·8	1287
St. Martin's in the Field	27·9	1292
St. Olave's	28·1	1301
St. Luke's	28·2	1309
St. George's East ...	28·8	1333
Holborn...	29·7	1375
Strand	33·4	1546

TABLE V.

ANNUAL DEATH-RATE FROM TUBERCULOSIS PER MILLION LIVING, AMONG CHILDREN UNDER 5 YEARS OF AGE. 1881-90.



MORTALITY FIGURES

and slightly better than that of Warrington, a town of the same size, which I have taken for comparison. In the figures before you the evils of too much beer, if they exist in Burton, seem to be more than counterbalanced by good wages and content.

The death-rate of the Strand, as compared with Wantage, presents us with a contrast which shews clearly enough the influence of locality on mortality.

It is probable that the Strand death-rates are rather too high, as it does not appear that any correction has been made for deaths in institutions. I will, therefore, put in a diagrammatic table of the mortality figures in London sanitary areas as given by Mr. Shirley Murphy, after correction for age, sex, and institutions, which seems to show quite clearly that the struggle for life increases as we come from the outskirts to the centre of our huge overgrown town (*see* Table 4).

I will also put in a similar diagram of the death-rate from tuberculosis of children under five in the registration districts of London. These figures have undergone no correction for institutions, but they show clearly enough how, for all practical purposes, we may say that overcrowding is the chief cause of tuberculosis (*see* Table 5).

There is more tuberculosis among children under five in London than in any other county. The mortality from this cause in London is 18 per cent. higher than in Lancashire.

Occupation.

Turning now from locality to occupation, I am still dependent upon Dr. Tatham's invaluable figures. In the second part of the supplement, from which I have previously quoted, elaborate tables are given, showing the mortality of occupied males between the ages of 25 and 65 for the three years 1890-91-92, *i.e.*, the census year and the year preceding and following.

Taking the mortality of all males (occupied and unoccupied) as 1000; the comparative mortality of the various groups is expressed by a number which is called the mortality figure, thus:—

MORTALITY FIGURES.

All Males	1000
Occupied Males	953
„ „ (London)	1147
„ „ (Agricultural Districts) ...	687
Clergymen, Priests, Ministers	533
Inn, Hotel Servants (London)...	1971

I merely take examples from the hundred different classes in which occupied males are grouped in these tables.

How widely different is the mortality of these groups of professions and occupations is shown by contrasting the clergy with the London hotel servants, which are almost the Alpha and Omega of the whole series. No two groups show more effectually the necessity of taking into consideration the age distribution of groups of individuals before contrasting their mortality. The mortality figure of the inn-hotel servants (London) is nearly four times as great as that of the clergy; and yet out of 1000 of either group it will be found that more clergy die in any one year than London hotel servants.

This apparent paradox is explained by the accompanying diagrams, which give the age distribution of 1,000 clergy, as contrasted with 1,000 London hotel servants (*see* Tables 6 and 7).

Not only has the age distribution of any particular occupational group a marked influence on the annual death-rate of that group, but it also influences the causes of death in a degree scarcely less marked.

This fact will be best brought out by taking extreme examples.

On page 3 of the "Abstracts," given with Part II. of the supplement of the 55th Report, is a table of the causes of death of 400,057 occupied males occurring in England and Wales in 1890-1-2, and from this table I have constructed two diagrams, one of which shows the age distribution of 1000 deaths from phthisis occurring among occupied males in England and Wales, while the other shows the age distribution of 1000 deaths from bronchitis (*see* Tables 8 and 9).

TABLE VI.

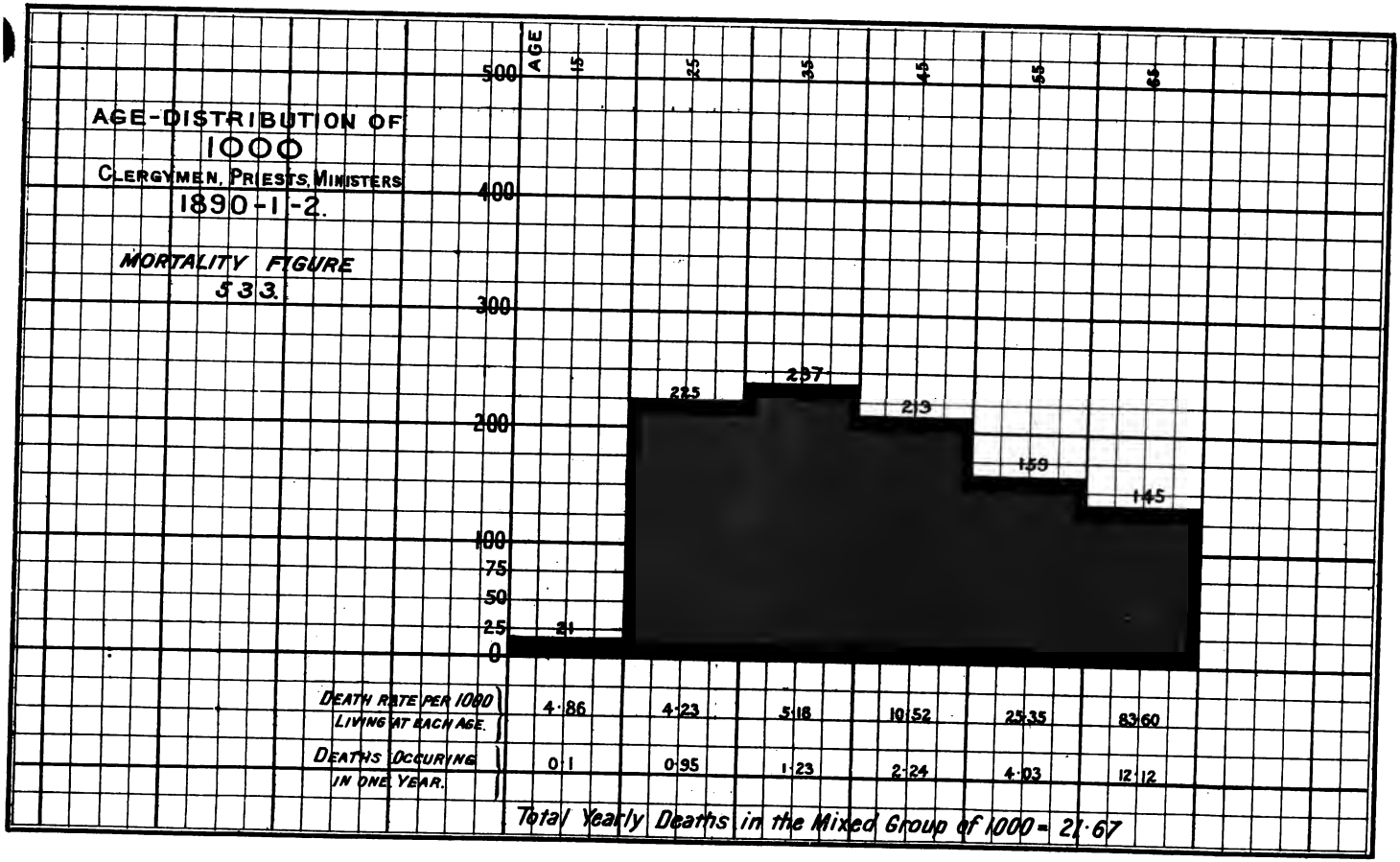

AGE-DISTRIBUTION OF
1000
CLERGYMEN, PRIESTS, MINISTERS
1890-1-2.
MORTALITY FIGURE
533.
AGE
15
25
35
45
55
65
500
400
300
200
100
75
50
25
0
21
225
237
213
159
145
DEATH RATE PER 1000 LIVING AT EACH AGE.
4·86
4·23
5·18
10·52
25·35
83·60
DEATHS OCCURING IN ONE YEAR.
0·1
0·95
1·23
2·24
4·03
12·12
Total Yearly Deaths in the Mixed Group of 1000 = 21·67

TABLE VII.

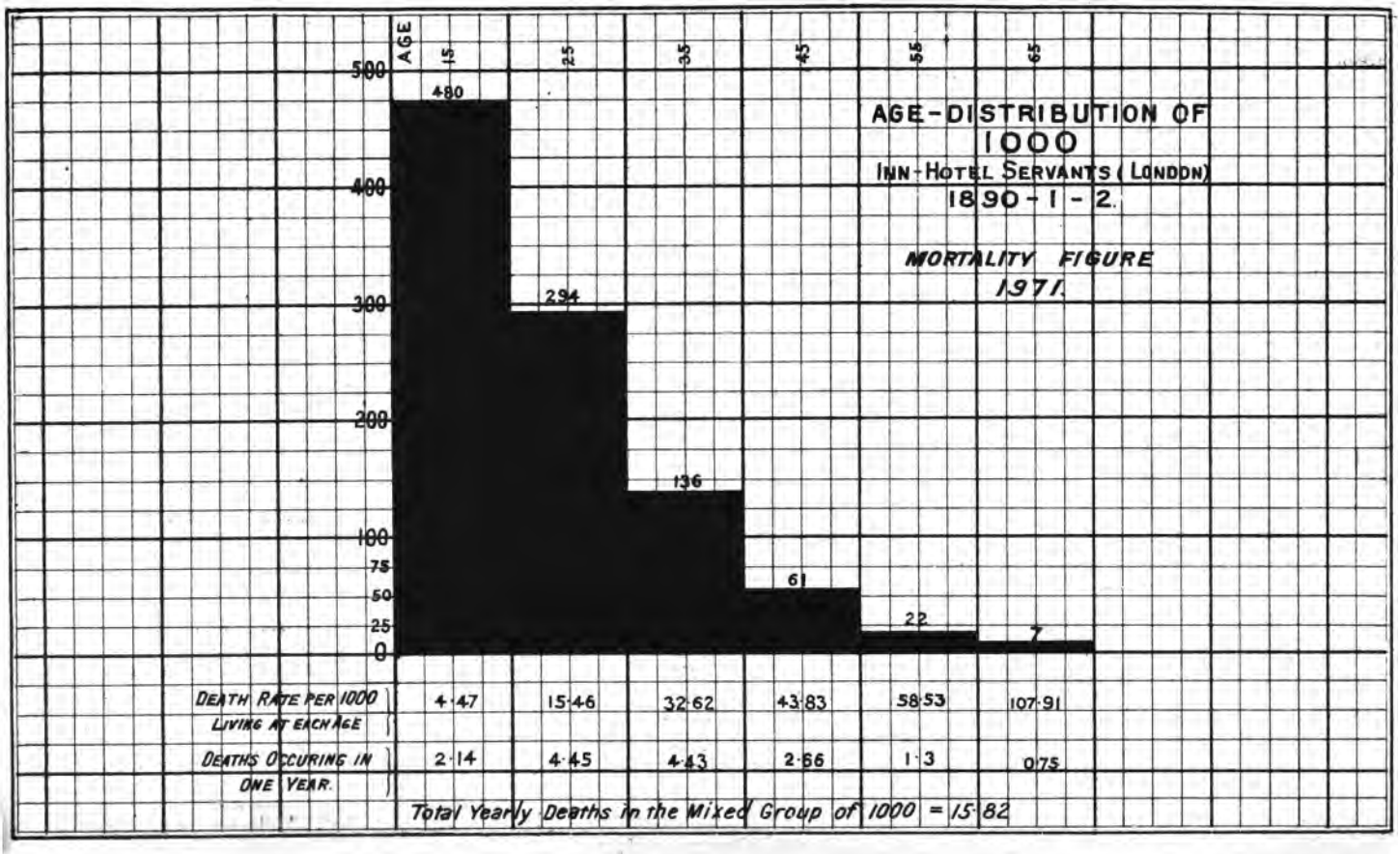

AGE-DISTRIBUTION OF
1000
INN-HOTEL SERVANTS (LONDON)
1890-1-2.
MORTALITY FIGURE
1971.
AGE
15
25
35
45
55
65
500
400
300
200
100
75
50
25
0
480
294
136
61
22
7
DEATH RATE PER 1000 LIVING AT EACH AGE
4·47
15·46
32·62
43·83
58·53
107·91
DEATHS OCCURING IN ONE YEAR.
2·14
4·45
4·43
2·66
1·3
0·75
Total Yearly Deaths in the Mixed Group of 1000 = 15·82

TABLE VIII.

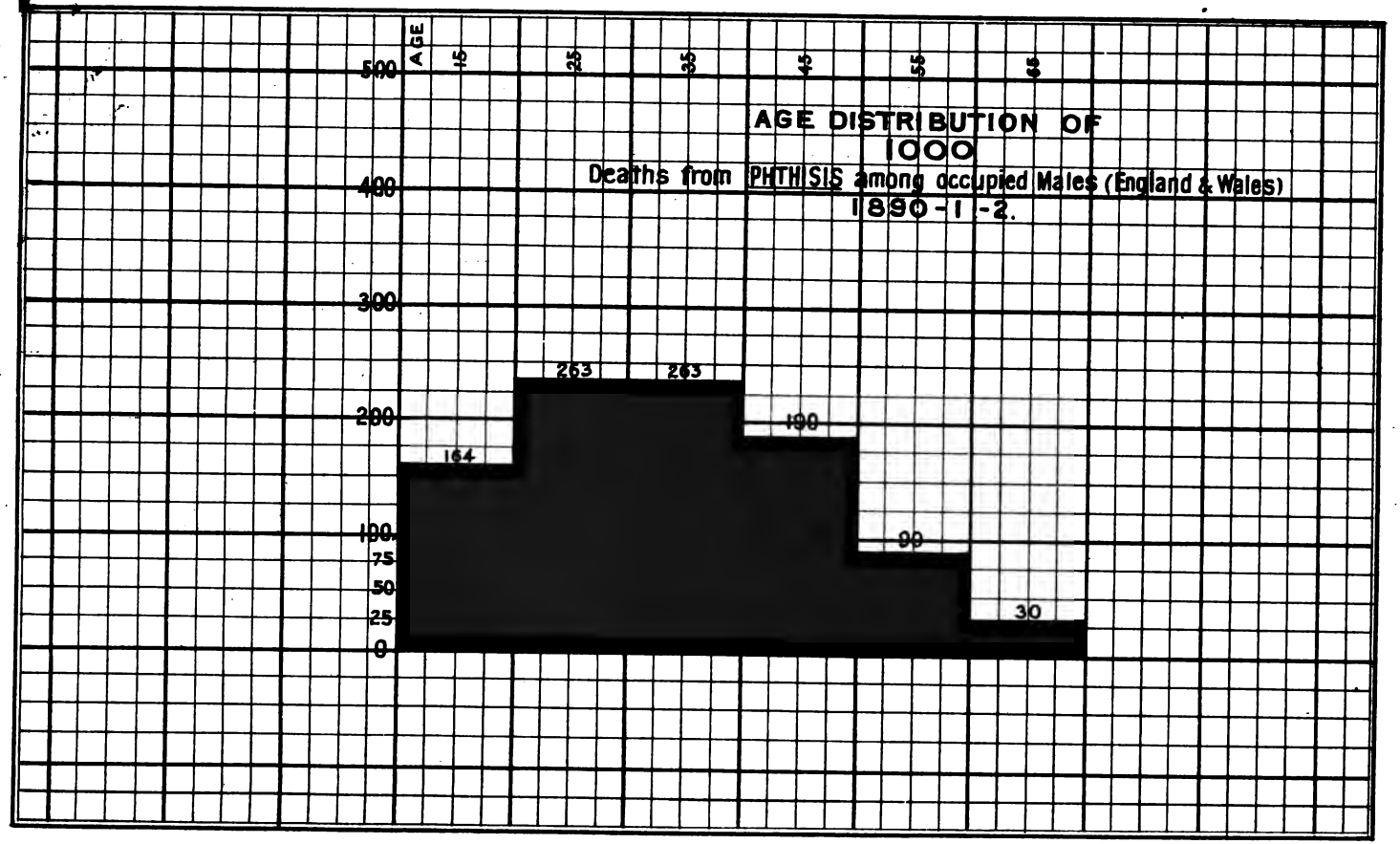

AGE DISTRIBUTION OF
1000
Deaths from PHTHISIS among occupied Males (England & Wales)
1890-1-2.
AGE
15
25
35
45
55
65
500
400
300
200
100
75
50
25
0
164
263
263
190
99
30

TABLE IX.

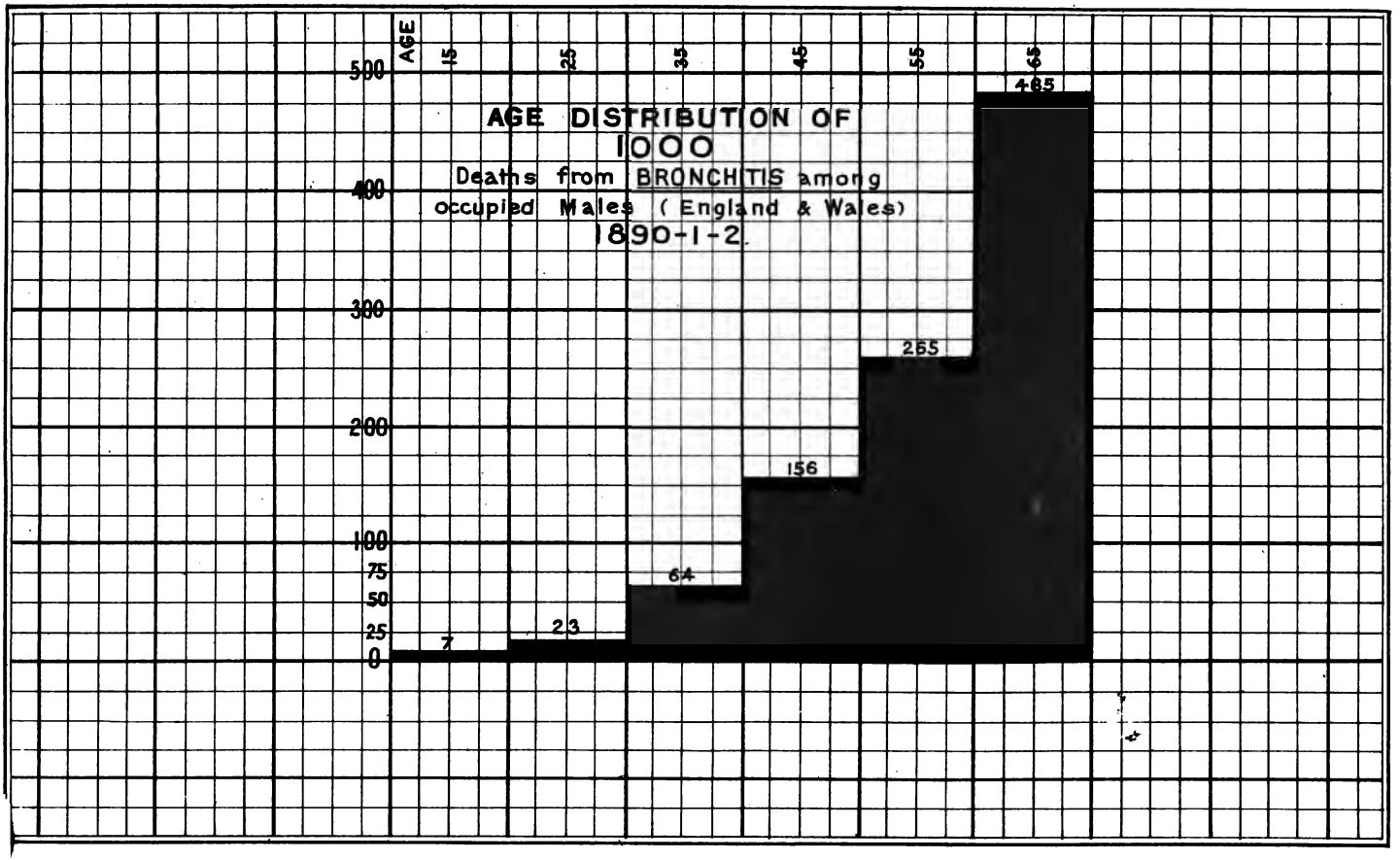

AGE DISTRIBUTION OF
1000
Deaths from BRONCHITIS among
occupied Males (England & Wales)
1890-1-2.
AGE
15
25
35
45
55
65
500
400
300
200
100
75
50
25
0
7
23
64
156
255
485

TABLE VIII.

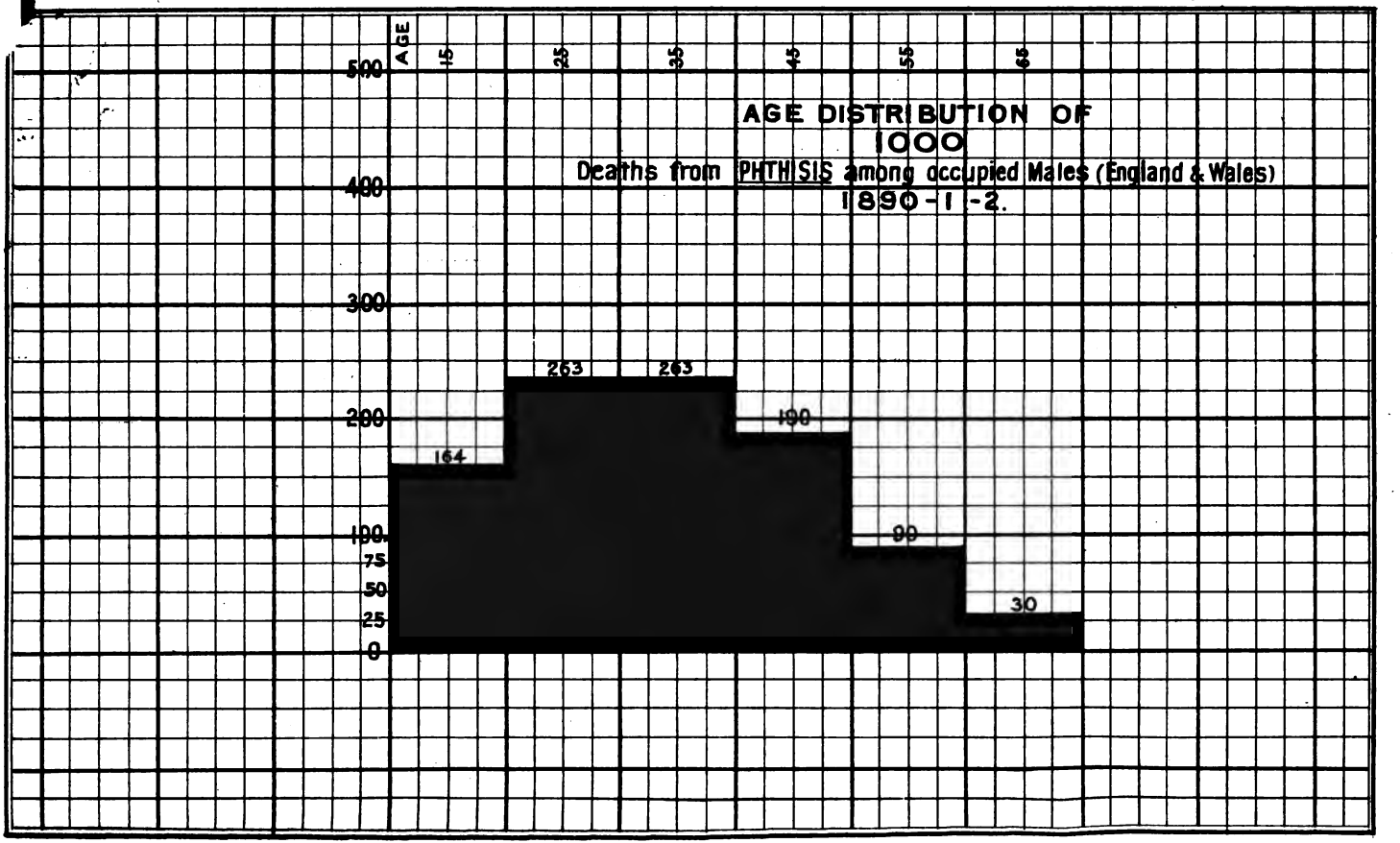
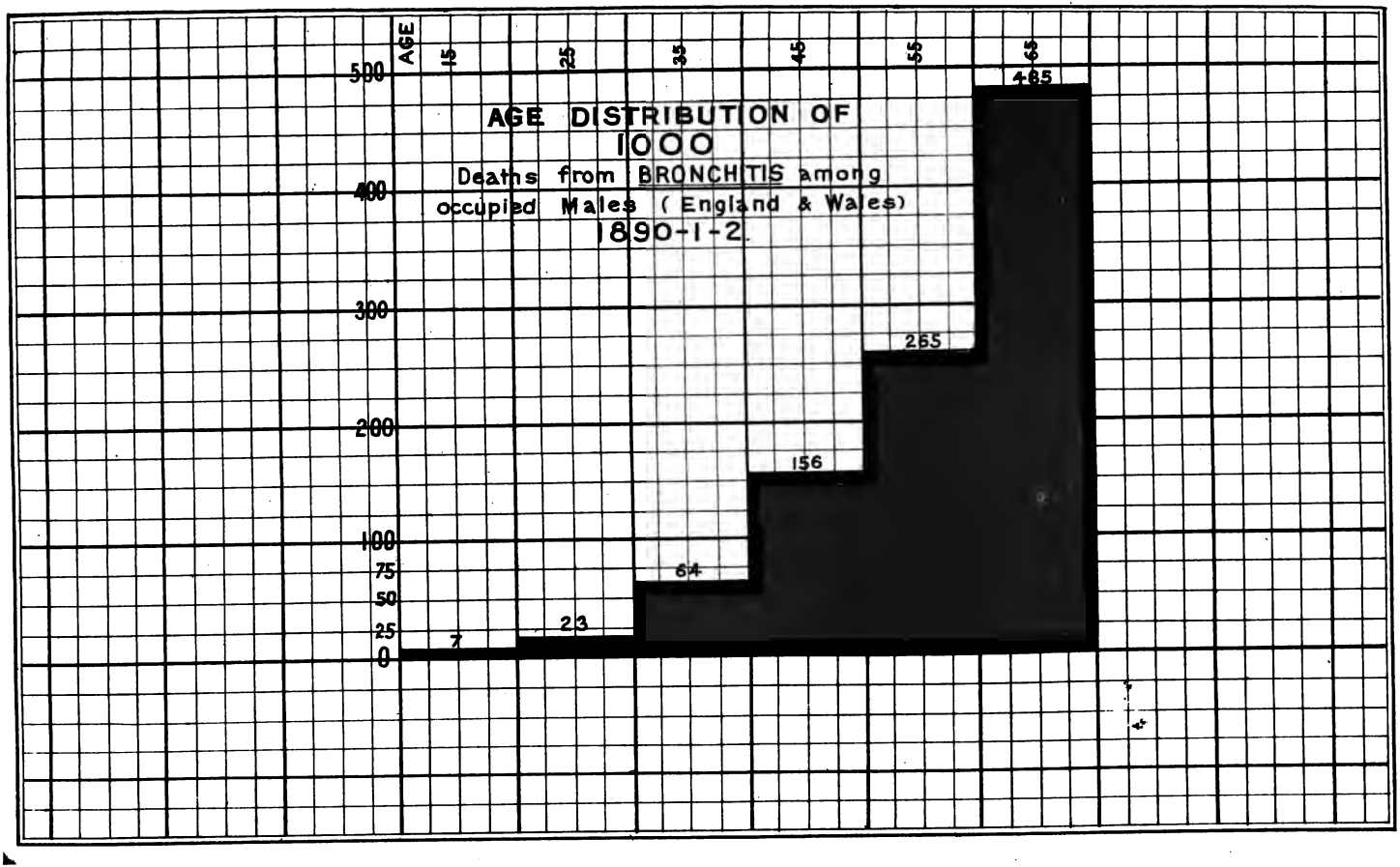

AGE DISTRIBUTION OF
1000
Deaths from PHTHISIS among occupied Males (England & Wales)
1890-1-2.
AGE
15
25
35
45
55
65
500
400
300
200
100
75
50
25
0
164
263
263
190
99
30

TABLE IX.


AGE DISTRIBUTION OF
1000
Deaths from BRONCHITIS among
occupied Males (England & Wales)
1890-1-2.
AGE
15
25
35
45
55
65
500
400
300
200
100
75
50
25
0
7
23
64
156
265
485

These diagrams clearly show that the incidence of phthisis occurs mainly in the first four decades, while the incidence of bronchitis is largely in the last two.

These two sets of diagrams show very clearly how necessary it is to allow for age distribution before considering the incidence of death or disease among any groups of population, whether the groups be based upon locality or occupation.

It is interesting to note how the reputation for trustworthiness of local crude death-rates has gradually waned, until we have come to regard them as misleading rather than otherwise.

The "Mortality Figures" which are given by Dr. Tatham for the different occupational groups have not been calculated from the crude gross death-rates of those groups, which would have been valueless; but from the death-rates for each of the four decades between 25 and 65. In the same way, the mortality figures for the different diseases, as they affect each occupational group, have been calculated from the incidence of a given disease in each of the four decades.

And here one must pause for a moment to ponder on the enormous amount of work which these calculations must have involved. The debt which the medical profession and the Insurance offices owe to the staff of the Registrar-General's office is incalculable. It is nevertheless doubtful if the decennial supplements are studied as widely as they deserve to be.

When we come to examine the various occupational groups, we are taught practically the same lesson that we learn from the three life tables.

The trades with the highest mortalities are precisely those which Life offices have learnt by experience to beware of, such as the liquor trades, the lowest class of labourers, and dangerous trades which are well known and need not be particularised. Some of the mortality figures are, perhaps, based upon too small a number of facts.

Limiting oneself to groups, which are numerically strong, the following mortality figures seem to be instructive :—

ALL CAUSES.

Clergy	533
Schoolmasters	604
Farm Labourers	632
Railway Engine Drivers	818
Legal Profession	821
Shopkeepers	859
Commercial Clerks	915
Coal Miners	925
Building Trades	957
Medical Profession	966
Textile Manufacturers	1054
Law Clerks	1070
Metal Workers	1128
General Labourers	1221
Innkeepers, Servants, &c.	1659
Dock and Wharf Labourers	1829

Looking at the above list, it is evident that fresh air and comfortable circumstances are all important in determining mortality.

In Insurance work we are accustomed to attach considerable importance to certain diseases, and it will be of interest to see the relation which is borne by these diseases to occupational groups.

Taking GOUT to begin with, we find the mortality figure for all occupied males is two, so that as a cause of death gout is not important.

GOUT.—MORTALITY FIGURES.

All Occupied Males	2
Occupied Males (London)...	6
,, ,, (Industrial)	2
,, ,, (Agricultural)	2

GOUT.—MORTALITY FIGURES. (*Continued.*)

Liquor Trades	20 to 10
Plumbers, Painters	10
Law Clerks	8
Medical Profession	8
Building Trades	4

Turning from gout to URINARY DISEASES, we find the following mortality figures for Bright's Disease:—

BRIGHT'S DISEASE.

All Occupied Males	27
Occupied Males (London)	37
" " (Industrial Districts)	33
" " (Agricultural Districts) ...	21
Lead Workers	85
Liquor Traders	70 to 50
File Makers	82
Plumbers, Painters	63
Law Clerks	59
Medical	56
Farm Labourers	12

Turning to other forms of urinary disease, we find :—

OTHER DISEASES OF URINARY SYSTEM.

All Occupied Males	14
" " (London)	19
" " (Industrial Districts) ...	17
" " (Agricultural Districts) ...	11
Lead Workers	76
Liquor Traders	36, 23
Law Clerks	35
Medical Profession	23

Seeing that lead plays such an important part in the determination of gout and urinary disease, we may profitably turn to plumbism, the mortality figure for which among all occupied males is only one,

PLUMBISM.

All Occupied Males	1
„ „ (London)	0
„ „ (Industrial Districts) ...	1
„ „ (Agricultural Districts) ...	1
Lead Workers	211
File Makers	75
Plumbers, Painters	19
Potters (Earthenware)	17
Glass Makers	14

The relationship of plumbism to gout and kidney disease, although well recognised, is yet imperfectly understood; and it is certainly of very great interest to find that, notwithstanding the excess of gout and urinary disease which obtains among occupied males in London, this excess seems to be independent of plumbism, which, as a cause of death among occupied males in London, is unimportant. On the other hand, in the small group of "lead workers," in which the mortality figure for plumbism is 211, the mortality figure for gout is 0.

It must be stated, however, that the mortality figures for "lead workers" appear to be based upon 128 deaths only.

Next we may turn to diabetes, for which the mortality figures are as under:—

DIABETES.

All Occupied Males	7
„ „ (London)	8
„ „ (Industrial Districts) ...	7
„ „ (Agricultural Districts) ...	7
Legal Professions	28
Medical „	23
Clerical „	17
Liquor Trades	17, 25
Railway Engine-Drivers	14

Diabetes is largely a disease of the educated classes. It is interesting to note the liability of the engine-driver in connection with the well-known danger to diabetics of long railway journeys.

Next as to cancer.

CANCER.

All Occupied Males	44
„ „ (London)	59
„ „ (Industrial Districts) ...	48
„ „ (Agricultural Districts) ...	40
Chimney Sweeps	156
Liquor Trades	70 to 59

With the exception of the chimney sweep, who does not trouble Insurance offices to any great extent, there seems to be no very marked preponderance of cancer in any group. The rate for the Londoner is 47 per cent. above that of the countryman.

Let us finally examine the mortality from phthisis among some occupational groups.

PHTHISIS.—MORTALITY FIGURES.

All Males	192
Occupied Males	185
„ „ (Agricultural Districts) ...	135
„ „ (Industrial Districts)	223
„ „ (London)	277
Innkeepers, London	265
Inn, Hotel Servants, London	607

It will be noticed that the occupied male in London has a mortality figure from phthisis more than twice as great as the occupied male in agricultural districts, and that 4½ hotel servants in London die from phthisis to one occupied male in agricultural districts.

The death-rate from phthisis among hotel servants in London is the highest which is furnished by any class of occupied males, and

the fact may well claim our attention. Doubtless the drinking habits of this class must increase their vulnerability to all forms of disease, but I take it that there is something in addition to this which causes their special tendency to death from phthisis.

Taking the number of deaths from alcoholism, liver disease, and Bright's disease, as a fair measure of the intemperance of a class, we have the following mortality figures:—

	Alcoholism.	Liver Disease.	Bright's Disease.	Total.
Occupied Males	13	27	27	67
„ „ (Agricultural)	7	24	21	52
„ „ (London) ...	18	30	37	85
Innkeepers, London	124	146	55	325
Hotel Servants, London ...	139	89	60	288

The above table shows us that the effects of intemperance are more strongly marked among the masters than the servants. There must, therefore, be other causes in addition to alcoholism, to account for the high mortality from phthisis of hotel servants.

It will throw light upon the subject if we tabulate the mortality figures from diseases of the respiratory group in the five classes we are considering.

	Bronchitis	Pneumonia.	Pleurisy.	Other Respiratory Diseases.	Total of four Causes.
Occupied Males	88	105	7	21	201
„ „ (Agricultural Districts)	37	55	5	16	113
„ „ (London) ...	127	110	9	29	275
„ „ (Industrial Districts)	154	178	10	24	366
Innkeepers „ ...	105	171	12	49	337
Hotel Servants „ ...	153	246	13	44	456

Finally, let us add together the mortality figures for phthisis and the respiratory group in these classes.

COMPARATIVE MORTALITY FROM PHTHISIS AND RESPIRATORY DISEASE AMONG OCCUPIED MALES AGED 25–65. 1890-92.

Occupied Males	386
„ „ (Agricultural Districts) ...	248
„ „ (London)	552
„ „ (Industrial Districts)	589
Innkeepers	602
Inn and Hotel Servants (London)	1063

This table shows clearly the enormous mortality from lung disease in London and industrial districts as compared with the country.

In the three years, 1890-92, there died in London 43,134 occupied males, aged 25–65, and of these 21,026 died from lung disease, including phthisis, but excluding 1253 deaths from influenza.

These figures show plainly that cities are the chosen home of lung disease, and that among Londoners the hotel and inn servants are the greatest sufferers. It is noteworthy that while the deaths from phthisis and lung disease among innkeepers are only 9 per cent. above the average of London, the death from the same causes among inn-hotel servants are 63 per cent. greater than the average of occupied males in London, and more than four times as numerous as are the deaths from the same causes among occupied males in country districts.

The mortality from phthisis is very marked among the shop-keeping class, but much more marked in those whose shops are habitually closed than in those who work in open, breezy shops.

The following table of the mortality figures for various trades shows this clearly :—

PHTHISIS.

Printers	326
Bookbinders	325
Hatters	301
Tobacconists	280

Tailors	271
Drapers	260
Shoemakers	256
Butchers	195
Milksellers and Dairymen	166
Fishmongers	160
Greengrocers	154
Grocers	131
Agriculturists	106
Physicians	105
Clergymen	67

It is to be noted that in the above list those who habitually are brought presumably into close relationship with the bacillus tuberculosis, such as the physician who attends the patient, the clergyman who visits him and buries him, the dairyman who sells tuberculous milk and butter, the butcher who deals in the meat of tuberculous oxen, and the agriculturist who attends on tuberculous cows and spreads their tuberculous dung upon the soil, show no excessive tendency to phthisis.

The dangers which they are supposed to run are counteracted by fresh air and comfortable circumstances.

We have had abundance of evidence both at home and in the Colonies, that the herding of people in "barracks" of all kinds is a potent cause of phthisis, and that unless the greatest care be taken in the construction of all buildings in which persons live "in community," such buildings are liable to breed phthisis among their inmates.

Now hotels are buildings of this class, and I believe that the high mortality from phthisis among inn-hotel servants is largely due to the fact that they share the fate of all who are called upon to reside permanently in "barracks" or barrack-like buildings. The healthy person who makes a short sojourn in a hotel and is luxuriously housed probably runs little risk, but I see no reason why the hotel servant who lives and works permanently in such a building should escape the common lot of those whose lives are

similarly circumstanced. Unless extraordinary precautions be taken as to the cubic space and hygiene in the living and sleeping rooms of hotel servants, their risks of phthisis are obviously very great indeed.

To live permanently in such a building as the average hotel, which has all the faults of the obsolete prisons, the obsolete asylums, and the obsolete barracks, must be most depressing, and I can conceive no condition more likely to produce a craving for alcoholic stimulants. Further, there is a good deal of evidence to show that alcoholic stimulants are far more harmful to those who lead indoor lives than in those who live mainly out of doors; and I am very prone to believe that the housing question is more intimately connected with the temperance question than most persons believe, and that the high mortality from alcoholism and from phthisis and respiratory disease among inn-hotel servants are both very largely attributable to the faulty design of the houses in which they live.

The facts which I have culled from the Tables of the Registrar-General are of undoubted interest, but it will be asked how I propose to use those facts for Life Assurance.

Turning to the diagrams of the three Life Tables for (*a*) Healthy Districts, (*b*) England and Wales, and (*c*) Manchester Township, it is evident that if insurance rates be founded on Table B, the long lives of the healthy districts will compensate for the short lives of Manchester Township, which may be taken to represent the industrial districts.

Again, it is impossible to entirely dissociate locality from occupation; and there can be no doubt that the high mortality of the industrial districts is largely due to a class of inhabitants which does not much trouble the ordinary insurance office.

We must remember, however, that the tendency of the day is towards the depletion of the healthy districts and the congestion of the industrial districts, and the national facts which are represented by Dr. Tatham in life tables undoubtedly require watching.

Other things being equal, the security offered by a life office is proportionate to the numbers of the insured, for large numbers make the doctrine of averages more certain of fulfilment. Life

offices for small sections of the community are not perhaps likely to become general; but, nevertheless, the dweller in a healthy district, with 50 years expectation, may well ask why he should pay the same rate as the man with an expectation of 30 years only.

Although it may not be expedient to make any general application of the facts which I have brought forward, it is, I think, undoubted that the influence of locality and occupation must be borne in mind when dealing with doubtful lives.

I shall be told, and quite truly, that we do bear these facts in mind in so far as they relate to some occupations, notably the liquor trade, with which most offices will have no traffic of any kind; but I doubt whether the immense influence which locality and occupation undoubtedly exercise on longevity is sufficiently taken into account when considering the eligibility for insurance of persons with doubtful family histories or some weak point in their physical organisation or personal history. In determining such cases it would weigh heavily with me whether the applicant were an agriculturist at Wantage or a barber in the Strand.

Some of the offices which are largely concerned with the industrial classes should be able to give valuable information on the mortality of occupations, in addition to that which has been furnished to us by Dr. William Ogle and his successor, Dr. Tatham.

Discussion.

The President: I see by your acclamation, gentlemen, that you accord a hearty vote of thanks to Dr. Poore for one of the most interesting and suggestive lectures it has been my lot to hear in this Association. There are very many points in it; in fact, the material is so great, that when I saw the title I said to Dr. Mackenzie, our Secretary, "Why, that would make two papers instead of one." I may say that the best way we can show our appreciation for all the trouble which Dr. Poore has taken, and the admirable way in

which he has handled statistics which are very difficult to handle, will be to follow his paper up by an excellent discussion.

SIR HUGH BEEVOR: I feel exactly what you have said, Mr. President. I think we owe a very great deal to Dr. Vivian Poore for the way in which he has taken the vast myriads of figures which are to be found in the supplement of the two reports of the Registrar-General, and the way in which he has investigated them, and played upon them to a tune giving a harmony which is of great value to us, especially leaving us with the simple charts of expectation of life and the survivor table. I had reason to dip into this myself some time ago, and I am still seeking information. Anybody who is engaged upon any work of this kind, will always find an enormous amount of information which is at once to the point on the subject of any deaths with which he may be dealing. One point was spoken of at the end of the paper, and that was the fact that no doubt these considerations of the great differences between town and country people will have to come before actuaries, and different rates will probably be claimed from proposers. I understand from a letter from a doctor in Wales, that it is even now carried out to a certain extent in respect to a Society whose *clientéle* is somewhat like the Prudential, not with respect to particular occupation, but deaths from particular disease. I had a letter from a doctor saying that he doubted the reliability of some of the certificates of death from phthisis which came from mining towns in South Wales, because of the conditions of Insurance. The proposers insure in those districts —we know how very heavy the death-rate from phthisis is in Wales —and receive their policy on condition that they do not die of phthisis; at least, that is what I infer, although his letter is somewhat enigmatical. I understand that the policies were not to be carried through, or that there would be a diminished payment, at any rate, if the proposer died of consumption. There is one commanding fact in this industrial high death-rate, and that is, that it specially affects respiratory diseases, there is far more excess of lung diseases—I am not speaking of phthisis—than excess of general nervous diseases or circulation diseases. I shall be glad to have

an opportunity of studying Dr. Poore's tables in future, and to have them for reference.

Dr. de Havilland Hall: We always like to hear a paper by Dr. Poore, whether it is on the burial of the dead, or the burial of excreta, or such a paper as we have had to-night. He always places everything so clearly before one that we owe a great debt of gratitude when he comes forward and gives us a paper. The very wealth of his material rather confuses one in attempting to make any remark about the various points he has raised. One thing which struck me from the Life Assurance point of view was the question of locality. The great difficulty we have in Life Assurance in estimating the healthiness of any particular locality as regards an individual who is about to insure, is, that we are now living in days when we have to deal with such a very fleeting population. They are always on the move, and I think that that is especially the case with those who go in for insurance. It is the active, business, bustling man, the man whose occupation takes him about, that is likely to insure, whereas, those who are rooted to the soil—the squire, the farmer, for the most part—are not likely to take up a policy of insurance. One is constantly having brought before one commercial travellers, and others whose occupation takes them from place to place. So that, although the locality of the individual certainly would influence me considerably when I have to deal with a doubtful life, still, that is not of so much importance as his occupation. People are much more stationary in occupations than they are stationary in locality, though you will hear that there has been more change of late years; there has not been the same tendency for a man to follow his father, and keep up the same occupation during his life. Even doctors are constantly changing their occupation. Only yesterday a friend of mine, who has been in practice for some years, said: "I have got so disgusted with general practice that I am going to make one more start, and if that fails I will go on the Stock Exchange. That is the only thing a man at my time of life can take up, without any previous education." When a man insures he insures as a farmer, perhaps he fails, and takes a public-house, and he passes from the most healthy to the worst of all occupations.

Passing from locality, I come to the question of the unfortunate hotel servant. I should very much like Dr. Poore to give us some statistics of male servants not employed in hotels to have compared with them.

Dr. Poore: The male indoor servant's life is a good one.

Dr. de Havilland Hall: That would strengthen the position Dr. Poore has taken up, that the hotel servant has some special cause for his mortality. I agree with him that there must be something in addition to the alcohol, because if the master suffers very much less from alcohol than the servant, when the presumption is rather in favour of the master getting more alcohol than the servant, it is probable that the very defective ventilation, which those poor unfortunate individuals have in their sleeping apartments, has something to do with it. In my early days of consulting work, I have been called in to hotel work, and seen in consultation the most miserable places. I really think that, if the people who make use of hotels realized the risk they are running in going to some of them they would be more careful. One sees the way in which influenza goes like mad through an hotel when it is once started, simply on account of the defective ventilation, as I believe. I think it is quite possible that some of the diffusion of phthisis at the present time is due to the fact that people go to hotels and there they are exposed to very insanitary conditions. Many of the attendants are tuberculous, and the visitors contract tuberculosis themselves. Those are two of the points which struck me particularly in Dr. Vivian Poore's paper. Without having the tables to look over I feel I cannot say anything which would be worth listening to at a meeting of experts.

Dr. Crosby: I should like to confirm what has fallen from Dr. de Havilland Hall. It has struck me that the cause of the heavy mortality among servants of large establishments, such as hotels and clubs, is just what Dr. Hall has said—the defective sleeping arrangements from overcrowding and imperfect ventilation. Doubtless those who lead a country life, breathing pure air and keeping early hours, free from excesses of any kind, have an extra chance of longevity.

Now we come to the question of the mean ratio—the middle line on the diagram—from which, I take it, the actuarial line is made for the formation and regulation of premiums. If one reviews a lengthened experience in Life Assurance, one must surely come to the conclusion that the rate charged for twenty-five years of age, the average rate, is a little too high; and if offices were to regulate their charges according to the highly scientific manner in which Dr. Poore has dealt with life, a very different state of things would result. I hope and trust that these materials will be printed and that we shall have an opportunity of having them before us and of reading and carefully thinking them over, and I hope that some great good will come out for the fair average life, which at the present moment pays for many bad lives.

Dr. Glover Lyon: I rise to congratulate Dr. Poore upon the clear manner in which he has brought out the figures. Of course, that he would do it correctly goes without saying, but to do them so clearly, and to have shown us them in such graphic forms, is a matter for congratulation. There is one thing I should like to point out. A large number of Dr. Poore's figures were gathered from men who certainly would never think of insuring. Men content to live in dirty, overcrowded houses in dirty parts of the city, would never dream of insuring their lives. Therefore, although they are extremely interesting medically, so far from their applying to Life Assurance, rather the inverse would apply. A man who insures his life, and who is obliged to live in the Strand, would lead a course of life quite different from the man from whom those figures are taken. So that it is rather the complement of these figures that would apply to a man applying for insurance living in the Strand. Then there is a very great difference in all cases between insured lives and others. When I made an investigation with Mr. Manly, the President of the Institute of Actuaries, about consumption, we found that there was only about half the mortality from consumption amongst insured lives as amongst the general population; so that, if we had taken the Registrar-General as a guide, we should have made a great mistake indeed. But although there was only

about half the mortality, yet the curve of age, according to the Registrar-General, and according to the insured lives, remained similar in form, showing there was something to be learned from the figures of the Registrar-General, even as applied to insured lives. Sir Hugh Beevor has made an extremely interesting remark with regard to lung disease. It was shown by Dr. Poore that the mortality from lung disease was much greater in London than in the country. I think it is very important. The agricultural labourer is exposed to many causes of lung disease, and I think it is very important that we should recognise that the mere atmosphere of London—I cannot see how you can put it down to anything else—is a very potent factor in causing lung disease. That is interesting from a life point of view, and from all others, I think.

The President: I am sure that Dr. Poore will be gratified by the discussion. There seems to be a general agreement in his conclusions as far as we can judge without examining the figures for ourselves. Of course, a paper like this requires careful study before you can at any rate absorb the conclusions into your own mind—testing the figures, and so forth—but so far as we can go, I think all the conclusions that Dr. Poore has brought before us he has proved. There are one or two points which are very interesting. As regards the locality question, I must say that it was beyond what I expected. I did not know that there was such a tremendous difference between the heart of Manchester and a place like Wantage. Then we come to the occupation. The author has brought that out very clearly indeed. I quite agree with him. The question of hotel keepers and hotel servants has often occurred to me. First, with regard to hotel keepers, the author was very careful to limit himself to the male sex, but I should like to make a remark about the female sex. We know that there are a large number of women who keep hotels and public houses, and so forth. My attention was first drawn to the matter by the late Sir William Gull, and my father noticed the same thing. He said: "If you are sent for to a certain public house, you will find that the publican will die of drink. His wife will not die of drink. She may take some drink, but not like her husband. Then she will marry the

leading traveller. He will die of drink. Then she will marry another traveller, and he will also die of drink. So the woman who is in the thick of the liquor trade survives three husbands." Sir William Gull told me he had known that occur over and over again, and my father, who also had very large experience, said the same. I have noticed it myself. I have had a publican's wife bringing me her third husband affected with some disease—perhaps consumption or sometimes other diseases. I think Dr. Poore has drawn attention to the great difference between these men and their servants, and certainly it is very striking. After all, the publican can come and go as he likes; he takes as much exercise or air as he likes. He has always someone to attend to the bar, and so forth. Also in hotels it is the same thing, so that he really dies of his own vices, or of his temptations. But the poor hotel servant is in a different condition altogether. Much has been said about the question that they do not take much alcohol. I do not think they do as a rule. Then there is the question of where they sleep. There is also another question, how do they eat. In a great many of these hotels the time allotted for the servants' meals is nothing at all. Waiters have often come to me and consulted me, and they really have not had a decent meal for months. They have been able to go to the kitchen and snatch up something, and eat it in a hurry, without sitting down, and then go back again to their work. Then their hours of work are perfectly absurd; they work 16, 18, or 20 hours out of the 24. Perhaps Dr. Poore will excuse my alluding to something that I said last time, and that is about nationality. We know with regard to London waiters that a very large number of them are not English at all; they are Germans, Italians, Swiss, and various nationalities, and therefore not likely to endure the climate and hardships well. I quite agree with the author, the treatment of hotel servants is a serious matter, and that public attention ought to be drawn to it, because there is no doubt of the mortality and sickness among these poor people living in unwholesome garrets. I have seen the most awful places in London in which they are stowed away. I know they have long hours, and very small opportunities of getting food, and that very often they are not well clad. They have a hard

life, and live in a very tainted atmosphere, so that it is no wonder they die soon. Dr. Poore's reference to diabetes was very interesting, especially as to its prevalence in certain professions. I was not astonished about the lawyers, because in a great many cases diabetes of a particular type is due to excessive brain work. If you look at the anxious and difficult cases which lawyers have to deal with, and the same may be said of doctors, you will not be at all surprised to hear of the large mortality. On the other hand, we see that parsons do not suffer so largely, I think.

Dr. Poore: Moderately; they suffer more than the trades.

Dr. Crosby: The author did not draw any distinction between the diabetes of youth and the glycosuria of age.

Dr. Poore: No; it was not possible to do that. I think a great deal of publican's diabetes is glycosuria.

The President: Then with regard to the diffusion of tuberculosis in hotels. It is possible there are cases, but I remember some years ago, when there was a great deal of talk about Davos and tubercular infection, it was said that people caught consumption in the hotels on account of deficient ventilation, and from being packed too closely. I made an examination of several hotels, and of a great many cases, and went into it very thoroughly, and the only case that they could show me to prove, as they said, a case of tubercular infection, I found was not tuberculosis at all, but typhoid fever. That was the upshot of my enquiries at Davos for two or three years. I do not say it is not possible, but, as regards some of those places, we must bear in mind that they have one good habit, and that is, they sleep with windows open, and that makes some difference to them. I confess I have never found much spread of tuberculosis in hotels.

Dr. G. V. Poore, in reply, said: I thank you for the kind way in which you have received my paper, and I must apologize for bringing

forward so many figures. You, Sir, and Dr. Crosby, have spoken about hotel servants. I think that their conditions of life are often far from satisfactory. When you come to the master man—the sporting publican—he has not at all a bad life. He is always about somewhere in the open air. He kills himself by sheer hard drink. He ought to live as long as Methuselah, but he does not. There is no doubt of the great difference between the master and the man.

Then with regard to what Dr. Crosby said, about the rates of insurance being too high, one must remember that the rates are calculated on the death-rate for the *whole* population whose mortality figure is 1000. But the insured population are *occupied* people, with a mortality figure of 953, and as Dr. Glover Lyon said, and as I hinted in my paper, the undesirable people do not insure, so that there is a considerable chance in favour of the office. I alway say to the young who are beginning insurance work, "Remember that Life Insurance is a risk, and do not be too finikin." I think that is sometimes a fault, which may tend to keep away profitable lives. Young pathologists are apt to be too fanciful in excluding men—they do not take fair risks.

I am much obliged to Dr. Glover Lyon, as I recognise in him a mathematician, which I am not. I was rather afraid when he got up that he was going to tackle me. When one comes to deal with numbers one is very apt to be caught tripping, especially as I confess I have no right whatever to consider myself a mathematician, even in the smallest degree.

I do not think I have very much more to answer, Sir, in what has fallen from the various speakers. Dr. de Havilland Hall spoke about locality. I brought forward the comparison of the Strand, and Burton, and Wantage, and the whole of England, for the purpose of showing there was not much in it for practical purposes; that we must not be too finikin in these things, but must only go to the broad facts. I think broad facts, derived from large numbers, are of some use. Again, I thank you.

"EXTRA PREMIUMS,

WITH SPECIAL REFERENCE TO THEIR REMOVAL AFTER

RE-EXAMINATION,"

By T. GLOVER LYON, M.A., M.D., Cantab.,
Physician to City of London Hospital for Diseases of the Chest, and Medical Officer National Mutual Assurance Society.

The result of the present system of rating up for Life Insurance is so unsatisfactory, that I have thought myself justified in bringing the subject before the Association and offering for discussion a modification in our procedure.

Let us first consider the present position—and here I acknowledge with pleasure the assistance given me by Mr. Levine, who has this department in hand at the National Mutual Life Office.

Suppose a number of applicants, after enquiries involving considerable trouble, have been offered loaded policies. A process of self-selection, or what I should prefer to call Option, takes place. The result is that only about half take up the policies offered them, Of acceptors, a large part have been forced to insure by financial difficulties, and are so far inferior lives. Again, those who voluntarily accept the load on their policy, it may be assumed, have less confidence in their prospects of life, than those who "do not see the fun of paying an extra." There is reason to believe that self-estimation of this kind is correct in the majority of cases. Then again, some of the better applicants rated up at one Office are taken at ordinary rates at others. So it will be seen, that the applicants forming the loaded class of Assurance Offices are not identical with the class recommended by the Medical Officers, but are composed of the more questionable of the lives recommended. Again, in general, good lives are more likely to surrender or allow their policies to lapse. These processes are known to affect unafvourably the mortality of lives remaining on the Offices' books.

I am inclined to think, that in the case of loaded lives surrenders and lapses act against the Offices more than in the case of lives taken at ordinary rates.

It is well to point out an essential difference between the method of adjusting ordinary and extra premiums. The former are determined by actuarial calculations based on statistics, rates of interest, &c. Extra premiums relate to each particular case, and are determined by the prognostic acumen of Medical Officers.

In order to guard against loss they should be based on the supposition, that any suspicion of existing or threatening defects is well founded.

If albumen be present, it should be assumed that it indicates the commencement of kidney disease. If doubtful murmurs be heard, it should be assumed, for the moment, that organic heart disease is present.

Extra premiums should be adjusted upon three considerations:—

1. How much the normal break-up of old age is likely to be anticipated.

2. What extra risk will run through life.

3. Variations in risk with advance of age.

Reference to so-called expectation of life is, I believe, fallacious and misleading. It is satisfactory to find that the extras recommended have safeguarded the Offices. It might have been otherwise.

The extras imposed have on the whole more than covered the abnormal mortality in rated-up lives. It is interesting, by the way, to note that the extras recommended on account of family history have been found to be rather excessive, and those for personal defects rather under the mark. Stated generally, the

thesis I wish to lay before the Association for discussion is this: If loaded policies were offered by the Offices with an undertaking in certain cases to remove the extra premiums on satisfactory re-examination, many would take up such policies who now refuse to do so, and would be less likely to surrender them, or allow them to lapse.

These would be for the most part better lives than those who accept under the existing terms.

It would be found that the Offices would be safeguarded under such a system.

Of course, it would be useless to offer re-examination policies to applicants, unless the extra risk present at the first examination were likely to vanish.

There are five reasons for loading lives.

1. Bad family history.
2. Bad previous history.
3. Definite personal defects.
4. Personal conditions of doubtful medical significance.
5. Unfavourable conditions of life.

Bearing these in mind, I shall now enquire into the advisability of granting loaded policies with removable extra premiums in specific cases.

CONSUMPTION.—The ordinary premium provides for an ordinary mortality from consumption, and an extra is called for only when an applicant has more than the ordinary degree of susceptibility, hereditary or acquired, or is subject to an unusual intensity of infection.

Suppose we have before us a man aged 25 with a slight family history of consumption, such as one parent or a brother having died of this disease. If there were decided delicacy present,

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or a badly shaped chest, or his condition of life unsatisfactory, most of us, I suppose, would reject the application.

But if the man were found to be of normal physique and his surroundings satisfactory, it might be possible to accept such an applicant at ordinary rates. I am not prepared to go so far as this, but I should not hesitate to recommend a loaded policy such as I have described, with re-examination at the end of 10 years.

If the man should then be found in a satisfactory condition, I think the extra should be removed, and all the extras returned.

GOUT.—The extreme variations in prognostic significance of a tendency to this disease are well known. Dr. Symes Thompson showed us some years ago how grave was the outlook in some cases. To guard against loss I would recommend in early cases of Gout a heavily loaded policy with prospect of removal after re-examination, but I should much like to hear the opinion of members who have a greater experience of the disease than myself.

SYPHILIS lends itself, I think, to a re-examination policy, but here again I should like to hear the opinion of experts.

ABNORMALITIES OF THE CIRCULATION — No irregularity can be overlooked in this predominant partner in the tripod of life. We often have before us applicants presenting abnormal conditions of circulation, which we feel fairly certain do not indicate changes likely to entail grave results: examples of such are palpitation, quick and slow beats, irregular beats, irregular murmurs, high tension even with cardiac hypertrophy.

But while these signs are present, these cases cannot, I think, be taken at ordinary rates. They may be deferred, but they are often urgent. Such conditions are common in men about to marry, and caused by the disturbing influence attending a step which is not without emotional strain; they rapidly disappear in

most cases. But whether these symptoms are permanent or not cannot be determined by one examination ; a re-examination policy would, however, meet them.

IMMODERATE-MODERATE DRINKERS.—Sir Dyce Duckworth points out that a large portion of the successful business and professional men of the day come under this sufficiently expressive designation. Sir Dyce tells us that, although in the majority of cases, even slightly excessive indulgence in alcohol must tend to shorten life, it does not preclude insurance, and advises acceptance with an extra. I would go a little further. Many men making their way in business—a time at which they frequently wish to insure—are somewhat immoderate in the use of alcohol. But once firmly established these men generally reduce their consumption of stimulants, and become moderate and even abstemious. Such men feel in robust health, and are apt to scoff at the idea of an extra premium ; but if they saw the prospect of its removal they would, I think, be more inclined to take up a loaded policy. There are many other instances where a re-examination policy would fairly meet the case, but I will only refer to three more :

ALBUMINURIA, without symptoms,

PSEUDO-GLYCOSURIA, and

OBESITY.

What do we know of the prognostic significance of these conditions? Very little, I think. We know that they do not, as a rule, indicate any immediate danger, and that the prospects of grave developments are remote.

I would therefore recommend that these cases should be put on trial under a re-examination policy.

In conclusion, I am most anxious to hear the opinions of the Members of the Association upon the points raised in this paper, and hope the Members present will give the results of their experience, so that this discussion may have a practical outcome.

Dr. DE HAVILLAND HALL thought that applicants suffering from intermittent Albuminuria should be accepted with great caution. Quite apart from the possibility of the development of Bright's disease, the kidneys in these cases represented a weak link in the chain; and the supervention of any acute disease, such as pneumonia, might bring about a fatal result. He could not adopt Dr. GLOVER LYON'S somewhat optimistic view of men who had exceeded in alcohol during their struggling days becoming moderate later on. Dr. HALL recommended a debt on the policy as a suitable method in some cases of meeting the difficulty of extra rating. Though an extra might be remitted, the idea of the return of premium could not for a moment be entertained.

Dr. POLLOCK, in his experience, had met with very few cases in which a remission of the extra premium imposed at the time of acceptance had become possible. Of course, an addition made for residence in an unhealthy climate, as India or the East Coast of Africa, would cease when the life insured returned to England. Any liability to a return of disease acquired in such climate would have been met by the extra originally imposed. Bad family history, as shown in reference to Phthisis, might be outlived, as when proposer is over 50 and is of robust build, temperate, and of sound constitution, and not following any unhealthy occupation. But such cases require careful examination, and all the above conditions should be present. Definite personal defects remaining recognisable, but without increase or symptoms of disordered health, should in no case undergo remission of the extra originally imposed. To this class belong heart or lung affections, albuminuria and glycosuria, even when the two latter disorders have ceased, for we have to appreciate the liability to a recurrence of the affection. Some old mitral cases, with sufficient compensation by hypertrophy, have from time to time been accepted for short periods with considerable additions, but it should never be forgotten that as age advances the period of degeneration arrives, so that cases which have remained for many years inert may develop serious symptoms and

a breakdown of health result. As regards the list of affections set down for consideration as to a possible remission of an extra by Dr. GLOVER LYON, such as syphilis, gout, consumption, &c, when actually existing at the time of proposal, they ought not to have been accepted on any terms, as no extra could compensate the liability. In the case of syphilis there would appear to be a kind of rule, that a certain time should have elapsed since the last symptoms, but for existing disease there should be no door open. I have never yet accepted a case where the habits were doubtful, nor can I conceive a case in which an extra should be considered at all—so such do not come under present consideration. On the whole, considering that we are guardians of the Companys' assets, I believe that, while we are bound not to deter proposers by making useless additions to the premium, we are, on the other hand, to adjust extra payments with our best judgment, and having imposed them to stick by them with the exceptions I have noted.

Dr. HECTOR MACKENZIE: My friend, Dr. GLOVER LYON, has told me this evening that when some time ago he proposed to read a paper on the reconsideration of rated-up lives, I did not give him much encouragement to pursue the subject. I am glad, however, that he went on, for he has given us a very good paper, which has led up to an animated discussion. If I was not very encouraging on a former occasion, the reason probably was that I then entertained the view, as I do now, that the removal at a later period of a surcharge, which has been made after a careful consideration of the case in all its bearings, would be unwise and inexpedient. Surcharges, I maintain, are based upon the doctrine of averages as much as the premium rates themselves. The amount of the extra is determined on the assumption that the payments are to be made during life, or in the case of endowments, until the attainment of a certain age. If, in some cases, the extra is to be taken off, after a few years, the Office will receive less than the sum required to provide for the extra risk which it has undertaken. If, in some cases, where the life has improved, the extra is to be taken off, the

Office should have it in its power in other cases where the life has deteriorated, to increase the extra. I think Offices should take up a firm attitude in the matter, and decline to consider applications for removal of extras. It is quite a different matter if the policy-holder chooses to make a new proposal, when he might get terms slightly better. If he gets better terms he may then drop his old policy, but he will probably find in the end that he has gained no real advantage, for he will lose in bonuses what he saves in premiums. I would have no objection that the stipulation should be made, that if the proponent wished on taking out the policy that the extra should be reconsidered at the end of, say seven years, he should pledge himself to come up for examination, if then living, being informed that the extra would be either increased or diminished, according to circumstances. That would only be equitable, but, of course, it is not practical, for no one would agree to have his premium subsequently raised under any circumstances, although everyone would like to have it reduced. I myself proposed at a meeting of the Association some years ago, that in certain cases the extra should only be imposed for a limited number of years, pointing out that by that means the extra is paid more equally by the lives which fall in early and by those which survive. I think an option might sometimes be given so that a man aged twenty-five might pay a pound extra for ten years, instead of ten shillings extra for the whole of life. I confess I was a little surprised to hear that only about half of the proposals in which the lives are rated up are taken up. We were promised a paper some little time ago on rejected lives by an actuary; an equally interesting subject would be lives rated up but not carried through.

The PRESIDENT: There is very little doubt that the great value of Dr. GLOVER LYON'S paper lies in the number of points he has raised for discussion—points which most of us have to deal with every day, and often would be glad of a little assistance in deciding. I do not see how premiums, which have been already paid, can be as remitted when the life is accepted on more favourable terms

such a proceeding would be disastrous to the Company's accounts. With regard to family history, I admit that its importance has diminished, since other causes of disease have come to the front, but in the case of cancer and tubercle it is of great importance, and where it exists I always ask myself: Has a man or woman who has lost one or both parents from cancer or tubercle as good a prospect of life as one who has not? I decide in the negative. The presence of albumen in the urine, even if intermittent, unless it can be explained by some passing ailment, is to my mind a bar to life insurance, as it establishes a proof of vulnerability which may soon manifest itself in other directions.

Dr. Newton Pitt thanked the author for the interesting communication that he had brought before the Society, and the many interesting and debateable questions he had raised. He was quite in agreement with him in thinking that the tendency of Offices in the past has been to rate up too highly defects in personal family history, and to deal in proportion too leniently with defects of development and in the physical condition of the applicants. A fine, well-developed man, whose weight is above the average, but who has lost brothers or sisters from phthisis, has probably a much better chance of living to the average age than an ill-developed man with a good family history. At present, when an estimate is made, that a certain defect requires an addition of, say ten years to the age, it is on the understanding that while some of the lives will mature long before their expectation, there will be others which will live beyond, so as to provide sufficient to prevent the Company from losing. The author proposes that these latter should be re-considered, and the addition after a few years should be dropped. If this is to be done, it is clear that it should be carried out on the principle of double or quits, and that the addition must be 20 years with the understanding that if the life wears well the addition may be remitted after a time. It is obvious that an addition which is suitable for a whole series will be totally inadequate when the best lives escape the addition, and it is charged only upon those that

have actually proved to be fatally defective. An investigation into the after history of a number of the cases of functional albuminuria, which have been published in this country and in America, shows that there is no evidence that in young people at any rate does chronic Bright's disease tend to develop, within a period of ten years in these cases; but many of them have died from other diseases although without previously showing other indications of constitutional weakness. This clearly shows that an addition ought to be made to these cases: because the presence of albumen even temporarily is an indication of a functional defect, which experience proves is associated with an imperfect resistance to acute illnesses. When an intermittent albuminuria occurs in an applicant over the age of 45, it is generally an indication of the onset of organic kidney disease, and it is unwise to accept such cases on any terms.

Dr. HINGSTON FOX deemed that the question was mainly an actuarial one, but thought that Dr. PITT's view was the right one. Advanced premiums, which were, he considered, in opposition to Dr. LYON's contention, adjusted according to average, were put, let them suppose, upon 100 second-class lives. If the rate was to be revised, and only those which turned out ill were to be made to pay the extra, this extra would need to be much larger—not "double," but it might be five times as large. On the present system of whole-life extras, the loss on those lives out of the 100 which died early was met by the others which lived, and this was surely the sound plan. Moreover, if revison was to take place at all, it must be fair all round, and the Office must be at liberty to increase the extra or decline the further risk, if the life had worsened. This was, f course, impracticable. As regards the method of adjusting advances, he agreed that it would be desirable to have one that was more scientific. But if we pursued the plan of estimating in our own mind, in the case of a proposer, how far short of his "expecta tion period" (mean duration of life) he was likely to fall, we could then advance him a sufficient number of years to bring him to the age at which the expectation had the desired value. This method

had some claim to be called scientific. Allusion had been made to the "Contingent Debt" mode of advance, in use by some Offices, and which he had brought before the Association in 1895. Further experience had on the whole confirmed the opinion he then expressed of this method, and, following Dr. POLLOCK, he considered it especially applicable to lives in which the extra risk could be well defined as occurring in the early years of insurance. When the extra risk belonged chiefly to the later years, as was the case in gout, heart-weakness, and with a family history of an early break-down—age, the "Contingent Debt" system worked badly.

Dr. GLOVER LYON, in reply, said he agreed upon the importance of avoiding, when possible, the "clean sweep" treatment of doubtful cases. The Medical Officers' first duty was, no doubt, to safeguard the Offices, but this should be done with the least possible sacrifice of business. The PRESIDENT's partial acquiescence in his proposals encouraged him.

The PRESIDENT here asked Dr. LYON how he would treat a case, age 25, of Albumen, without symptoms.

Dr. GLOVER LYON said he would put him up 10 or 15 years, and remove the extra at the end of 10 years if the albumen had disappeared and the man was found to be quite healthy. He confessed himself unable to imagine what process of mind was indicated by an attempt to estimate the expectation of life in any particular case. He failed to see any mystery in the vulnerability of certain Albuminuric subjects. They appeared to be identical in this respect with persons suffering from chronic Bright's Disease. They were prone to such diseases as pneumonia, and likely to succumb to acute diseases of all kinds. He felt gratified at the success of his efforts in eliciting discussion: this had been the object of his paper, and must be his excuse if he had appeared to express his own opinions in somewhat dogmatic terms.

Notes on a Series of 128 Early Death-Claims,

AND ON

26 such Claims from Cases personally examined.

By R. HINGSTON FOX, M.D., M.R.C.P.,

Physician to the United Kingdom Temperance Provident Institution, and (for London) to the Friends' Provident Institution.

It is commonly said that medical selection protects the Office for about seven years after entry. Even during this period, however, many deaths occur. Thus, in the combined experience of 30 American Life Offices to 1874, out of 35,000 total deaths of males, 10,000 occurred within nine and a half years of entry. This is a much larger proportion than is found in old established Offices at the present day, and it is due, doubtless, to a large number of recent policies in force when the experience was recorded. The same records state one per cent. per annum as the average mortality amongst those exposed to risk during the first 10 years after entry, which would give a mortality of less than 10 per cent. for the entire period of 10 years.

Thinking that it would be of value to obtain a clearer idea of the causes of this early leakage, and to enquire how far it is preventable, I have noted, during fifteen months past, the cause of death in all claims falling in to one Office within 10 years of entry. As, however, at ages in the latter decades of life, the space of 10 years exceeds one-half of the "expectation period" (mean duration of life), I have taken the half of the expectation period as the limit instead of 10 years, in the case of those entering after the age of 50 years.

A series of 128 consecutive early death-claims is thus obtained, which will be classified according to the causes of death. I have added the notes of 26 early claims, similarly limited, which have occurred in cases personally examined by me.

The 128 claims are, of course, too few in number to form the basis of statistical deductions, but they are sufficient to convey some general idea of the causes of death in the early years of insurance. The large majority of cases were examined on entry in the country, and the medical reports are generally brief. The cause of death is in each case taken from an inspection of the certificate of the medical practitioner in attendance, or of a certified copy of it.

Classification of Series of 128 Deaths according to Cause.

(The causes more strictly accidental come first on the list and those which were due to long-standing disease later.)

(1)	Accidents	10
(2)	Suicides (4 of these possibly accidental)	9
(3)	Childbirth (Primipara, aged 37 years)	1
(4)	Acute Infectious Fevers	16
	Viz.: Enteric fever, 6; Diphtheria, 2; Influenza, 4; Tropical fevers and Dysentery, 4.	
(5)	Acute Inflammations, etc....	21
	Viz.: Pneumonia, 12; Ulcerative Endocarditis, 2; Acute Rheumatism, 2; Acute Peritonitis or Appendicitis, 4; Septic poisoning following strain, 1.	
(6)	Hernia, Strangulated (Operation, Embolism; aged 56)	1
(7)	Malignant Diseases	10
	Viz.: Cancer, etc., 8; Epithelioma, 1; medullary leucocythæmia, 1.	

(8) Tubercular Diseases	27
Viz.: Phthisis, 17; of lungs and larynx, 1; of lungs and brain, 1; of bowels, 3; of kidneys, 1; Tuberculosis, 1. Also 3 probably tubercular, viz.: ulceration of bowels, meningitis following mastoid disease, and otitis media.	
(9) Certain General Diseases	4
Viz.: Pernicious Anæmia, 1; Diabetes, 3.	
(10) Bronchitis (probably secondary, or tubercular)	3
(11) Heart Disease, Rheumatic and Degenerative (including Angina pectoris, 1; and Aneurysm, 1) ...	9
(12) Certain Diseases of Nervous System	4
Viz.: Epilepsy, 1; General Paralysis of Insane, 2; Meningitis, in a publican, 1.	
(13) Diseases of Kidneys (1, acute, aged 34 years)	6
(14) Cerebral Hæmorrhage, Embolism or Thrombosis ...	6
(15) Cirrhosis of Liver	1
	128

With regard to the date after entry at which death occurred, there is but little difference to be found in the average duration of the policies under each cause of death. The deaths from acute infections and acute inflammations occurred somewhat earlier than the others. It is otherwise with the age at death, which shows much diversity in the various classes.

Average Age at Death.

	yrs.	mths
Total cases (128)	39	11
Tubercular Diseases (27)	35	7
Suicide (9)	35	11
Acute Infectious Fevers (16)...	37	7

	yrs.	mths.
Acute Inflammations, etc. (21)	38	2
Accidents (10)	41	1
Disease of Kidneys (6)	44	6
Malignant Diseases (10)	44	0
Disease of Heart (9)	48	0
Apoplexy, etc. (6)	52	10

Thus, so far as the limited data allow us to judge, tubercular disease, suicide, acute inflammations and acute specifics are more potent causes of early death in those entering in younger adult life than in later; and, on the other hand, disease of the kidneys, malignant disorders, disease of the heart, and apoplexy affect by preference the later decades. Accidents show a mean age at death not greatly differing from the mean age at death from all causes. In the case of the acute specifics, the greater fatality of these in later adult life would keep the mean age at death pretty high, despite the much more frequent occurrence of the diseases in early adult life. The average age at death from enteric fever was 43 years 8 months, and from pneumonia 44 years 2 months.

With regard to tubercular disease, it is noticeable that, although the average age at death is below that for all causes, it exceeds 35 years. As a fact, 8 of the 27 deaths from tubercle occurred at ages over 40 years, illustrating the frequency of consumptive disease even in the latter half of life.

Conversely, as regards malignant disease, although the mean age at death is higher than that from all causes, yet it is but little higher. One of the ten deaths from malignant disorders occurred at the age of 27, two at the age of 30, and three more between 40 and 50 years of age.

The records of these cases present some general features. It is to be expected that lives which fall in early should in a great

many cases show some evidence of weakness at entry. And this is so. Many present a bad family history, one or both parents having died early—sometimes of phthisis or an ill-defined cause—or one or more brothers or sisters died prematurely. Probably the proportion of weak family histories is much in excess of the average. As regards personal history, perhaps the least satisfactory factor in the estimation of a life, there is not infrequent mention of severe colds, bronchial or pulmonary attacks, dyspepsia, rheumatism, etc., but it is not clear that these are more common than in the average proposal. The personal condition is sometimes noted as "not robust," pale or pasty, and a few cases had disordered or rapid action of the heart. A considerable number showed abnormal height and weight records. Thus, out of 110 cases in which these measurements are stated, 26 were much under weight (mean height, 5 ft. 6½ in.; weight, 9 st. 1¾ lbs.), and 24 were much over weight (mean height, 5 ft. 7¾ in.; weight, 14 st. 4 lbs.). It is submitted that these deviations, when well marked, have some importance as indications of increased risk.

I now make a few comments on some of the causes of death.

Accidents form a large proportion of deaths in younger and middle life, but excepting by the special rating of dangerous occupations there is no means of anticipating the risk. In one case of death from fractured cranium at 32 years of age the father had died at 38 from gangrene following a sprain, and one brother or sister, out of three, had died at 17 years as the result of an accident. There may be thus in some cases a sort of family tendency to accidents, or there may be a vice of constitution or habits which render accidents fatal. **Suicides,** I fear, are increasingly common; in these cases there is often evidence of mental peculiarity, or of consumption or early deaths, in the family history. Thus a man who drowned himself at 45 after embezzling money had a brother who died "through excitement caused by excessive heat." A Telegraphist who strangled himself

at the age of 30 was noted on examination, eight years before, as not robust, peculiar and reserved in manner, often laughing. Both his parents had died early, of syncope and abscess respectively. A man who had been an accountant was run over by an engine at the age of 31 years; it was thought to be an act of suicide; he was in bad health suffering from lung hæmorrhage. On entry seven years earlier he was found to be thin, and his mother had died at 49 of bronchitis and inflamamtion. A man of 40, formerly a Publican, shot himself; eight years previously, when examined, he was noted as a little too stout, and suspected of taking alcohol unduly. A Clerk who cut his throat at the age of 25, whilst on a holiday, had a brother who was drowned at 26. A Coal Merchant strangled himself at 49; he was spare built, his mother died of "childbirth," and five out of nine brothers and sisters died young. In the three remaining cases nothing appears on the papers to throw light on the cause.

Acute Specific Diseases and Inflammations.—This also forms a class of deaths in which the cause is largely accidental. All we can do is to select subjects who would bear such fevers favourably. But an examination of the papers often shows some unfavourable feature, such as a faulty family history, or undue stoutness on the part of the proposer, which may have rendered him a bad subject for specific fevers. The following are examples: A Tin-smith died at 33 of enteric fever; his parents had died at 56 and 40, one of "disease after influenza," the other of unknown cause. A Professor of Science died at 37 of enteric; his sister died of phthisis at 33. A man of independent means died at 62 of typhoid fever; on entry eight years previously he weighed 14 st. 13 lbs., height 5 ft. 9 in.; he had had bronchitis. A cycle agent died of enteric at 36; his weight on entry nine years before was 13 st. 4 lbs., height 5 ft. 10 in.; his father died of phthisis at 50 years.

It may be a coincidence in my cases that 6 out of 10 deaths from enteric fever and influenza in the early years of assurance

were in men of heavy build. Probably stoutness, especially after forty years of age, is an adverse factor in the recovery from many acute specific diseases. The twelve cases of pneumonia were mostly of average or under weight, only two being heavy men, but many of them had a personal or family history of lung delicacy. The influenza cases, excepting for stoutness, appeared on entry to be unexceptional lives.

Two deaths occurred from Blackwater fever, at 36 and 28, in East and West Africa respectively, both to second class lives. One man was thin (9 st. 1 lb.; 5 ft. 7 in.), not robust, he had had pneumonia, and his mother died of empyema at 38. The other was a nervous man, and his mother had died at 36 of fatty heart. Two other deaths in warm countries (dysentery, hyperpyrexia) were in those who seemed to be sound at entry.

Dr. Hingston Fox then gave particulars of the twenty-six cases which had been examined by him personally for two Offices, and which became early death-claims; twelve of these were included in the consecutive series already described.

RESULTS OF THE EXAMINATION OF THE CAUSES OF THOSE DEATHS,

WHICH OCCURRED AMONGST

ASSURERS IN THE ALLIANCE ASSURANCE SOCIETY

WITHIN TEN YEARS OF TAKING OUT A POLICY,

By Dr. G. NEWTON PITT,

Physician to the Alliance Assurance Society and to Guy's Hospital.

The cases have been divided up in the accompanying tables into those which died before the age of 45, and those which died at a later age ; as the incidence of the different causes of death in two periods is distinct.

In order to determine to what extent diseases may have been overlooked at the time of examination, the cases of death, in the two groups, which have occurred within two years of Assurance, have been kept distinct.

There are 410 fatal cases.

A. Cases Fatal under the Age of 45 (263).

Of these, 51 died within 2 years, and 213 between 3 and 10 years after Assurance: the proportion is therefore identical. Deducting from the former the deaths due to Accident, Pneumonia, Puerperal Fever, Suicide, and Typhoid Fever, which could not have been foreseen, 27 cases remain, and many of these died from acute illnesses dating from a period later than the Assurance As the statistics extend over 12 years, the number of diseased lives, the detection of which may possibly have been missed at the examination, does not amount to more than one a year; a better result cannot be expected.

Within this period only three committed suicide, no greater than the average for the ten years; but the proportion of accidents was double the average.

The value of the medical examination was mainly shown in the great diminution of the deaths from Phthisis and from nervous diseases, the deaths from the former being one-fourth and from the latter less than one-half of the average for the ten years.

The most frequent causes of death under the age of 45 for the first ten years after Assurance are consumption (44), causing one-sixth of all the deaths, instead of a third, as would have been the case if there had been no medical examination. Vascular diseases cause 29 deaths. The effects of alcohol are shown by 17 deaths directly due to it, besides a considerable proportion of the 28 deaths from pneumonia.

The other causes call for no especial comment beyond the unimportant mortality from cancer at this age.

B. Cases Fatal over the Age of 45 (147).

Twenty-six of these died within two years, *i.e.*, exactly a proportionate number; but the effect of the medical examination is shown by the fact that none of the deaths were due to either alcoholism, general paralysis of the insane, or nervous diseases, and only two to phthisis.

The chief causes of death within the two years were vascular lesions, such as cerebral hæmorrhage and heart failure (10 out of 26), while before the age of 45 there were within the same period only 4 out of 51.

It is very easy to fail to appreciate the indications of the early stages of vascular disease after the age of 45; the number of deaths for the first two years being exactly proportionate to the numbers for the whole period, showing that medical examination does not eliminate these cases. In some cases the only indication has been a low specific gravit urine, the importance of which has generally been missed.

There was no case of suicide within two years of Assurance, although such does not vitiate the Policy.

The chief causes of death for the whole period of 10 years were vascular disease which caused one third of all deaths, 48 out of 147, and cancer which caused 21 (13%). The phthisis mortality (6) was of no importance. The deaths due to alcoholism and suicide were each five a year, much smaller than the respective numbers 17 and 14 before the age of 45.

Causes of Death.	No. of Deaths under the age of 45. Within 2 years.	Between 3 & 10 years.	Within 10 years.	No. of Deaths over the age of 45. Under 2 years.	Between 3 & 10 years.	Within 10 years.	Total No. within 10 years.
Abdominal Lesions ...	3	14	17	... 3	4	7	24
Accident	7	9	16	... 2	3	5	21
Alcoholism	4	13	17	... 0	5	5	22
Cancer	2	13	15	... 3	18	21	36
GP. of Insane	1	5	6	... 0	1	1	7
Nervous Lesions ...	1	18	19	... 0	7	7	26
Phthisis...	5	39	44	... 2	4	6	50
Pneumonia	8	20	28	... 1	10	11	39
Puerperal	1	4	4	... 0	1	1	5
Respiratory Lesions (other than Phthisis & Pneumonia.) ...	2	10	12	... 2	10	12	24
Renal Lesions	4	14	18	... 2	13	15	33
Suicide	3	11	14	... 0	5	5	19
Typhoid...	5	13	18	... 0	0	0	18
Vascular Lesions ...	4	25	29	... 10	38	48	77
Miscellaneous	1	5	6	... 1	2	3	9
	51	213	263	... 26	121	147	410
Deaths due to Vascular Disease.							
Aortic Aneurysm ...	0	1	1	.. 1	1	2	3
Angina	0	2	2	... 1	0	1	3
Cerebral Hæmorrhage...	0	5	5	... 3	15	18	23
Cerebral Embolism ...	0	0	0	... 0	2	2	2
Gangrene	0	1	1	... 0	2	2	3
Heart Disease	1	13	14	... 3	18	21	35
Syncope...	1	3	4	.. 0	0	0	4
Acute Rheumatism ...	2	0	2	... 2	0	2	4
	4	25	29	... 10	38	48	77

AN ANALYSIS OF 344 EARLY DEATH-CLAIMS,

BY

T. COLCOTT FOX, F.R.C.P., & S. W. CARRUTHERS, M.D.,

Medical Referees, Mutual Life Insurance Company of New York.

Dr. HINGSTON FOX has opened up a subject of the highest importance, and the suggestion made in the abstract of his paper made us look into the death-claims of our Office.

Dr. HINGSTON FOX remarked that almost 30% of the deaths in the American Offices to 1874 occurred within the first nine years of entry. Our figures naturally give an even more exaggerated proportion, because our Company has only existed in England since 1887, and a comparatively small proportion of its business was written before about 1893. Consequently we have only a small number of lives that have been on our books more than seven or eight years. Of a series of 374 death-claims paid at the London Office, no less than 334 are death-claims within ten years. (It may be noted here that claims paid through the London Office do not necessarily represent business coming in through the London Office,

and that therefore the present series cannot be made the basis of any direct comparison between the insured and the deaths, so as to ascertain the percentage of deaths to those exposed to risk in the different periods.)

The deaths have been divided into three series, as their number seemed sufficient, and this promised to bring out more clearly the effects of medical examination. In order to make the number of deaths in each series as nearly as possible the same, and thus to increase the trustworthiness of the results, the periods were not made equal in duration. They are (1) the first two and a-half years after insurance, 139 deaths; (2) the next two and a-half years, 106 cases; and (3) the final five years of the period under consideration, 94 deaths.

Two matters are worth remark before passing on to the analysis of the deaths.

1.—There is a larger actual number of deaths in the early years; this is greatly exaggerated owing to our Office being a new one (as far as this country is concerned). But this tendency must occur to a small extent in all Offices (and especially in those whose business is showing a good rate of expansion), because there will always be a smaller number of lives that have been exposed to risk for five years and over than of those exposed to risk for two and a-half years and over. That is to say, put in a slightly different way, only lives insured before 1895 can possibly contribute to the deaths in the third series, and those insured in the course of 1897 to the second series, while every insured life right up to those taken last week is a possible contributor to the first series of deaths (those occurring within two and a-half years after insurance). Therefore to compare the actual number of deaths at each period can never be strictly accurate.

2.— A much larger number of cases than we are able to present is necessary to obtain really representative results. This is shown by unmeaning irregularities in the individual causes of death in the different series: for example, the counterbalancing irregularities in typhoid and influenza, the variability in "other nerve diseases," and in "various accidents," and the occurrence of diabetes and female complaints in only a single series each, with the absence of acute rheumatism from one series of the three.

Comparison of actual numbers being, as has been explained, useless, we have adopted the plan of expressing the deaths from each cause in any period as percentages of the whole number of deaths in that period. It must be recognised that in dealing with percentages and not actual numbers, any increase in one cause of death must produce a proportionate decrease in all the others, and *vice versa*. To take a hypothetical example, suppose in the first period there were 25 deaths from phthisis and 75 from all other causes; while in the second period there were 50 from phthisis and still 75 from all other causes. The result is not simply that phthisis increases from 25% to 40% of the whole, but necessarily, of course, the deaths from other causes decrease from 75% to 60% of the whole. This effect will be plainly seen in the study of the various causes of death.

The causes of death have been grouped into three classes.

The first group comprises those where medical examination cannot have any eliminating effect — purely fortuitous causes which attack the strong and the weak alike. Such are typhoid, influenza, and other zymoses, acute pneumonia, acute Bright's disease, and accidents. At first glance these might be expected to form an approximately uniform percentage in each series of deaths; but by the actual increase of other causes there comes

to be a relative decrease of these, as has been explained. The actual figures are as follows :—

	Percentage of Total Deaths.		
	1st period.	2nd period	3rd period.
Typhoid Fever	13.66%	0.94%	4.25%
Influenza	3.59	7.54	3.19
Other Zymoses	4.31	4.71	0.00
Pneumonia	7.19	5.66	5.31
Acute Bright	1.43	0.00	0.00
Accidental Drowning ...	5.03	2.83	3.19
Various Accidents ...	6.47	0.94	3.19
Total	41.68	22.62	19.13

The second group comprises diseases which we may reasonably expect by our medical examination to exercise an eliminating influence, and consists of phthisis and other tubercle, cancer, alcoholism, apoplexy, insanity, heart disease, cirrhosis of the liver, and chronic Bright's disease. It is humiliating to find that this class amounts to 27% of all deaths, even in the first two and a half years; but, on the other hand, the figures prove that medical examination markedly affects these causes of death. They are as follows :—

	Percentage of Total Deaths.		
	1st period.	2nd period.	3rd period.
Phthisis	7.19	12.26	15.94
Other Tubercle	2.87	1.88	2.12
Cancer	2.87	7.54	7.44
Alcohol (so returned) ...	0.00	1.88	2.12
Apoplexy	3.59	7.54	4.25
Insanity	2.87	3.77	5.31
Heart Disease	5.75	8.48	11.70
Cirrhosis of Liver ...	0.00	0.94	3.19
Chronic Bright	2.16	4.71	6.38
Total	27.30	49.00	58.45

The third group consists of causes in which the value of medical examination is more doubtful; it of course includes miscellaneous groups of diseases which the number of cases at our command has not enabled us to subdivide, and which probably contain a few cases that might in a closer analysis have been assigned to one of the first two groups. Its figures, which need only be given as Totals, are as follows :—

1st period.	2nd period.	3rd period.
31.02	28.38	22.42

The fact that the class diminishes as time goes on indicates that it is chiefly composed of cases uninfluenced by medical examination; though its rate of decrease being so much less than in Class A shows that it is not purely made up of such cases.

The general trend of these figures is unmistakeable. It indicates that medical examination has a distinctly protective effect, which has certainly not exhausted itself at the end of five years, and may possibly not have fully done so at the end of ten. This effect seems most strongly marked in Phthisis, Insanity, Heart Disease, Chronic Bright's Disease, Cirrhosis of the Liver, and Alcoholism: but one must use extreme caution in drawing detailed conclusions from so small a number of cases.

In dealing with the matter of the ages at death and the physique, the same caution must be still more strongly remembered, though here again if we cannot press details there are yet several general conclusions that may fairly be drawn. (In the figures hereafter given, the whole 344 cases are not used, for in some instances the claim, though paid in London, was in respect of an insurer examined in other countries, of whose examination we have no particulars, and in a small number of cases the information is incomplete).

As regards average ages at death, the classes with the highest average are as follows :—

	yrs.	mnths.	
Other Urinary ...	61	4	(one case : hæmaturia & cystitis)
Aneurism	58	7	
Cancer	53	8	
Other Circulatory ...	52	11	
Heart	50	4	
Other General ...	50	3	(a vague class).

The lowest are :—

	yrs.	mnths.	
Obstetrical	32	2	(two cases).
Meningitis & Cerebral Abscess	32	3	
Accidental Drowning	33	3	
Other Tubercle	34	3	
Phthisis	35	7	
Suicide	35	11	

These figures show nothing sufficiently striking to need dwelling on.

There is rather more that is striking and interesting in the matter of weight. The causes of death with the highest average weight were these :—

Alcohol	averaged	24%	overweight.
Chronic Bright	,,	19	,,
Apoplexy	,,	18	,,
Cirrhosis of Liver ...	,,	18	,,
Gynæcological	,,	17	,,
Diabetes	,,	14	,,
Cancer	,,	13	,,
Gastric Ulcer	,,	12	,,
Heart Disease	,,	11	,,
Other Zymotic	,,	11	,,

It is of great interest to note that the first on the list is the key to almost the whole series of overweight cases. The preponderance of alcohol in the causation of the next three is indubitably very large: and it is a considerable factor in Gastric Ulcer, Heart Disease (which includes fatty heart), and perhaps even in diabetes. (It may be as well to say that the five cases of gastric ulcer were all in men, from 34 to 65 years of age, with a history of alcohol in one, and of gout in another, and that only one seems in the least suspicious of malignant ulceration: cases recorded as malignant ulceration were, of course, classed as cancer.)

This influence of alcohol is equally noticeable if we look at the individual cases more than 40% above normal weight, which are ten in number:—

Apoplexy	60%	overweight.
Diabetic Phthisis ...	55	,,
Cancer of Rectum ...	45	,,
Heart (valvular)	45	,,
Heart (aortic)	40	,,
Alcohol (syncope) ...	40	,,
Multiple Neuritis ...	40	,,
Gastric Ulcer (gouty) ...	40	,,
Apoplexy	40	,,
Chronic Bright	40	,,

The classes whose average weight is under normal are only three:—

Obstetrical	averaged	16%	underweight (2 cases only)
Phthisis...	,,	2	,,
Probable Suicide	,,	1	,,

Of these, only the middle one is of any importance. The individual cases more than 20% underweight were only four: phthisis, tubercle, insanity, and obstetrical.

It seems from this that we should look more suspiciously on overweights than on underweights, and that the special danger of the overweights is a tendency to alcoholic and gouty degenerative changes. It is certainly remarkable that the phthisis cases should average only 2% under weight, even though our standard of weight (hailing from America) is slightly under that in general use in this country.

LIFE ASSURANCE MEDICAL OFFICERS' ASSOCIATION.

A Meeting of the above Association was held at the rooms of the Medical Society, Chandos Street, Cavendish Square, W., on Wednesday evening, ~~December 5th~~ NOVEMBER 7TH, 1900, the President, Dr. THEODORE WILLIAMS, occupying the Chair.

Discussion on Papers by Drs. Hingston Fox, Newton Pitt, Colcott Fox and Carruthers.

THE PRESIDENT: Gentlemen, you will all agree with me that my first duty is to communicate a hearty vote of thanks to those gentlemen who have read papers this evening. I think we may consider that carried.

I will now ask you to begin the discussion, and I hope we shall have a very good one as there is plenty of material in the three excellent papers which have been put before you.

Dr. de Havilland Hall: Mr. President and Gentlemen: there is so much to be said, so much food for discussion in the papers which have been read, that I think no time should be lost in starting. We may look upon this as a sort of clinical evening, the kind of evening which I ventured to hope we should have when our Society started, and I trust that we shall have a repetition of it from time to time.

In Dr. Hingston Fox's paper there are matters which are most instructive to us all. I am in accord with Dr. Carruthers in what he said about over-weight. I have been accustomed for some years, when presenting to my Directors the Annual Report on the Mortality during the past year, to tabulate my cases into two groups, those dying seven years after insuring, and those dying afterwards. I am constantly reiterating to my Directors—among whom are one or two over-weight gentlemen—the extreme importance of separating out cases of extreme over-weight. I maintain that if you get persons of more than 15 per cent. over-weight, you should recognise that you are beginning to approach the margin of doubtful lives, and anything like 25 per cent. I would do my best to stop. I had a great difficulty at first in getting my Directors to listen to me, but they are beginning to see it now, because year by year the mortality among the over-weights is so great. We are very particular about under-weight. We do not, as a rule, take anybody who is more than fifteen per cent. under weight. The remarks of Dr. Hingston Fox about pregnancy I think are most valuable; that is to say, that it would not be advisable to take a woman who was pregnant at any age under twenty or over thirty, or soon after her marriage even if she were not pregnant. It would be better to defer such cases. At ages between twenty and thirty I think a moderate addition to the premium would cover it, such as £1 per cent. We had rather a bad claim a few months ago in my office. An individual, whom I had examined myself, had pus corpuscles in his urine, as a consequence of which we deferred him for six months,

After that he increased in weight, and when he came again looked in good health. We then took him with a five years addition. He became a claim in five or six years from tuberculous disease of the kidney. I suppose when he first came what we found was evidence of commencing tuberculous disease of the kidney. Within the last week there has been before my office a proposal from another office, one in which several offices shared, for sums totalling £40,000. In the urine of this case there were also a few pus corpuscles with a trace of albumen. I was surprised to learn that he had been accepted at ordinary rate by one office. I advised my directors to decline the life altogether, especially as I had heard that he had had his bladder washed out 18 months ago by Sir Henry Thompson. I thought a man like that was not a life which could be accepted. Possibly I am only reasoning from a small experience, but the presence of pus in the urine, whether from the bladder or from a stricture of the urethra, seems to me to be a reason for postponing a life.

I was very much interested in what Dr. Hingston Fox said about pernicious anæmia, because a fortnight ago we had at the office the proposal of a man about 35 years of age whose father and sister were said to have died within six months of pernicious anæmia, not in the same locality; the father died in one part of Scotland, and the sister in another. The deaths and causes were certified by two different medical men. It never occurred to me that these might be cases of malignant disease. I pointed out to my directors that pernicious anæmia was extremely rare, and I did not know that there was any hereditary tendency in connection with it. But the suggestion that Dr. Hingston Fox made that it was possibly some form of malignant disease was a thing which had not occurred to me. I now think it possible that this father and sister died of malignant disease, and that therefore I should have rated up the brother who applied for insurance. But it is now too late. However, I am not likely to get another case of that sort.

Turning to Dr. Newton Pitt's paper, he talked about suicide. I have always thought it was rather a mistake to allow people to insure their lives and then to commit suicide. I mean it seems rather a temptation for them to do so when an office recognises the claim of a suicide. Surely it is most desirable that we should do everything we can to discourage suicide, and I should certainly advise my office barring all suicides in the first five years, unless indeed the policy had been assigned so that the would-be-suicide would know that he would not benefit his family if he ended his life. It seems rather like offering a premium upon a suicide to allow a man to insure his life, blow out his brains, and then to have the premium paid to his family. It is true that the figures which Dr. Pitt has brought forward tend rather to disprove the view that I have taken on this subject.

There can be no question, I think, that urine of a low specific gravity should awaken suspicion, and that one should not accept a life over 40 years of age whose urine was of low specific gravity. Of course it may mean nothing, but, on the other hand, it may mean something very serious. I think one's duty is to advise that the case be deferred for a further examination, and I suggest a communication with the applicant's own medical man, so as to secure several specimens of water being taken.

I was astonished to hear Dr. Pitt say that lives over 40 years of age presented greater risk for insurance. My experience has been rather in the other direction. In the case of a man who comes to you over 40 years of age you know more about him; what he has had and what he has done; his habits are more settled in one direction or another, and I myself feel greater confidence either in accepting or rejecting the man over 40, than the man of 30, say. Certainly I prefer the man over 40 to the one between 25 and 30. A man under 25 has everything before him; all the possibilities of various illnesses, possibilities of falling into

bad habits, and so on, whereas at 40 we are treading on much surer ground. That is the view I have always held.

I should not be inclined to adopt Dr. Carruthers' view, and put down all the pneumonias as fortuitous conditions. I think that many of the deaths in these cases are due to alcohol. In healthy subjects there is, it is true, considerable risk attaching to cases of pneumonia; but the risk is very much smaller in those who do not take alcohol than in those who take it in anything like excess. I should be inclined to regard some of the mortality of pneumonia as attributable to alcohol, and not class it as fortuitous. If we can carefully investigate the history of a man, and of his antecedents, his occupation and all other details, I think we should be able to diminish the death-rate from pneumonia to a very great extent, as well as the deaths from accidents.

Now, one final remark about over-weight. The rating-up has not been sufficiently high with over-weights so far, and this remark will apply to any of those cases where there is a gouty or alcoholic history. The table which is exhibited here shows very well the great tendency for alcoholics to be of undue weight. That is the point I am always insisting upon, and for that reason I should like to include all licensed victuallers, because the mortality among them is so heavy. Certainly, in the case of a licensed victualler who is over-weight, I do my best to persuade my directors to refuse the application.

We are very much indebted, I am sure, to the gentlemen who have brought forward this evening these valuable contributions. I am myself accumulating a store of statistics which I hope to bring before the society at an early date.

Dr. Glover Lyon: Mr. President and Gentlemen, I should like to offer a suggestion to the Meeting before the discussion is

continued, viz., that as we have so much valuable material before us, the product of such great pains and labour, we should give a proper amount of time to its consideration and discussion. That, I think, would be obviously impossible to-night. In the first place, we have only just heard read these papers, and have not had the opportunity of looking over them beforehand, and unless that were done we cannot be expected to retain any proportion of their contents and discuss them adequately.

Therefore I propose the adjournment of this Meeting and discussion until December 5th.

This was seconded by Dr. VIVIAN POORE, and carried unanimously.

The meeting then adjourned.

Continued Discussion on Papers by Drs. Hingston Fox, Newton Pitt, Colcott Fox and Carruthers, on December 5th, 1900, Dr. T. Williams, President, in the chair.

THE CHAIRMAN: The business of this evening is the discussion on the three papers which were read at the last Meeting. Dr. Hingston Fox has very kindly made a table combining the three series of the death claims in the papers, and I will now call upon him to say a few words on the subject before we proceed to the discussion.

Dr. HINGSTON FOX: Having been asked to combine the tables from the three papers, I have endeavoured to put them into such a

form as would make the record of use, and so that it could easily be added to in the future. The result is as follows—

TABLE COMBINING FIVE SERIES OF EARLY DEATH-CLAIMS.

[SERIES IV. AND V. WERE ADDED SUBSEQUENTLY TO THE MEETING.]

The five series consist of the consecutive Early Death-claims occurring to five offices during definite periods. Deaths at ages under 45 years and within ten years of entry, and deaths at ages over 45 years within seven years of entry, are considered to be Early Deaths for the purpose of this table.

Series I. (Dr. Hingston Fox) consists of 110 deaths, occurring during a period of fifteen months amongst those assured in one, office.

Series II. (Dr. Newton Pitt) consists of 410 deaths, occurring during a period of twelve years amongst those assured in one office. (In the case of some of the deaths at or over 45 years a ten years' limit has been used, hence this Series contains a larger proportion of older lives.)

Series III. (Drs. Colcott Fox and Carruthers) consists of 330 deaths, occurring during a period of thirteen years amongst those assured in one office.

Series IV. (Dr. Theodore Williams) consists of 80 deaths occurring during a period of three years amongst those assured in one office.

Series V. (Dr. Montagu Lubbock) consists of 192 deaths, occurring during a period of eleven years amongst those assured in one office.

Series	Age at Death						Under 45 years		45 years & over	
	Duration of Policy...						Under 2 years	2 to 10 years	Under 2 years	2 to 7 years
	I.	II.	III.	IV.	V.	Total				
A.										
1. Accidents	7	21	25	1	13	67	22	35	4	6
2. Suicides (and probable suicides)	8	19	16	—	4	47	9	29	2	7
3. Childbirth (1), Puerperal (5), Obstetrical (2), Gynæcological (1)	1	5	3	—	—	9	2	6	—	1
4. Typhoid Fever	5	18	24	4	13	64	24	35	1	4
5. Influenza	4	—	15	1	5	25	6	10	1	8
6. Other Acute Specific Fevers: Diphtheria (6), Malaria (6), Yellow Fever (4), Dysentery (4), Cerebro-spinal Meningitis (3), Typhus (2), Scarlatina, Cholera, Smallpox, African Fever, Blackwater Fever, Hyperpyrexia (tropical), Fever, Idiopathic Pyæmia, each (1)	6	4	11	2	10	33	9	20	2	2
7. Pneumonia, Congestion of the Lungs, Broncho-pneumonia	10	39	20	8	14	91	16	43	8	24
B.										
8. Abdominal Diseases:										
Liver, not Cirrhosis (12), and Spleen (1)	—	6	1	3	3	13	1	8	—	4
Gastric Ulcer (11), Hæmatemesis (4), Gastritis (3)	—	9	5	2	2	18	5	6	3	4
Enteritis (2), Appendicitis and Typhlitis (9), Peritonitis (5), Rectal Abscess and Fistula (3), Duodenal Ulcer, Cholera Nostras, Ulcerative Colitis, Cirrhosis of Rectum, each (1), Digestive disorder (4)	4	7	12	1	3	27	5	14	3	5
Intestinal Obstruction (1), Strangulated Hernia (3), Intussusception (1)	1	2	2	—	—	5	—	2	1	2
9. Diabetes	3	—	2	2	4	11	1	7	—	3
10. Pernicious Anæmia	1	—	5	—	—	6	—	1	—	5
11. Respiratory Lesions, exclusive of Phthisis and Pneumonia, viz.: Pleurisy (6), Bronchitis (7), Asthma (3), other Lesions (5); not classified (24)	3	24	10	3	5	45	5	16	4	20
12. General Paralysis of Insane...	2	7	8	—	4	21	3	15	—	3
13. Insanity	—	—	5	—	1	6	1	3	—	2
14. Other Nervous Lesions, excluding Apoplexy	2	26	17	4	7	56	6	35	2	13
15. Malignant Diseases	8	36	20	7	12	83	2	27	8	46
16. Miscellaneous and ill-defined. Abscess (2), Erysipelas (2), Gout, Rheumatic Gout, Old Age, each (1), uncertain (6)	—	3	6	3	1	13	4	4	2	3
C.										
17. Tuberculous Diseases (167), Otitis media (2), Mastoid disease (1), and Addison's Disease (1)	24	51	46	16	34	171	26	125	7	13
18. Kidney Diseases: Acute (4), Chronic (26), not classified (38), Tumour of Bladder (1)	5	33	17	4	10	69	8	26	7	28
19. Acute Rheumatism	2	5	7	1	—	15	5	7	2	1
20. Vascular Diseases: Heart Disease ...	6	35	24	3	19	87	5	34	8	40
Angina	—	3	2	1	1	7	—	4	3	—
Aneurysm	1	3	1	—	2	7	2	1	1	3
Cerebral Hæmorrhage (including Apoplexy)	4	23	15	5	14	61	2	19	6	34
Cerebral Embolism	1	2	1	1	2	7	2	1	—	4
Cerebral Thrombosis	—	—	—	—	—	—	—	—	—	—
Gangrene	—	3	—	—	—	3	—	1	—	2
Syncope	—	4	1	3	1	9	1	7	1	—
Ulcerative Endocarditis	2	—	1	—	—	3	1	2	—	—
Other Circulatory Diseases	—	—	—	—	1	1	—	1	—	—
21. Alcoholism and Cirrhosis of Liver ...	—	22	8	5	7	42	5	24	2	11
Totals	110	410	330	80	192	1122	178	568	78	298

[As the causes are in all cases taken from the Medical Certificates, the wording of the headings in the table is governed by that of the Certificates.

The Table, as above shewn, has been enlarged and revised since the meeting took place, and the numbers in the Series do not correspond in all cases with those given in the original papers, and referred to in the discussion which follows, some cases having been excluded by the revised limits of early claims, and a very few on account of insufficient particulars.]

I have made a rough classification of causes of death. I do not put that classification forward as in any way complete, or free from objection. It is purely a rough one for clinical purposes, and I daresay it can be much improved at a future time. I hope, however, that the causes are so set down that it will be possible to re-arrange the classification in any way that may be desired, or to adapt it to any future method that may be suggested by others. It will be seen that I have arranged the causes under three heads (A), (B) and (C), *i.e.*, Claims Less Preventible, Doubtfully Preventible, and More Preventible; the word preventible being used in the sense of preventing loss to the office by the exercise of foresight on the part of the examiner. The causes that come first, being accidental, are those to which foresight would be less applicable than to any; those which come in the middle are doubtful, and those which come at the end belong to the class of diseases, for the early beginnings of which we are especially watchful in examining cases. In division (A) it shows the vagaries of small statistics that the second series does not contain a single death from Influenza, while the third series contains a great number. In division (B) I have put abdominal diseases in some detail, because some future observers may wish to classify them in a different way, or to place some of them among infectious fevers. It is a little surprising to see the deaths from General Paralysis of

the Insane total so largely, even in the early death claims of insurance.

Under (C), I have, following Dr. Newton Pitt's paper, put the long list of Vascular Diseases in detail. I felt rather inclined to put Ulcerative Endocarditis among the infectious diseases.

The varying modifications of the time limit used in making the three series has some effect, though only slight, upon the results. Lives entering at ages from 50 years upwards, and falling in near the end of the ten years, do not strictly form early death claims. For example, a man who enters at 60 and dies at 69 does not in any sense form an early death claim. In order to exclude such cases, I took in my paper, half the "expectation period" as the limit in those entering after the age of 50. Dr. Pitt took a 7 years' limit in most of his later cases. The consequence is, that the second paper, and especially the third paper, record a somewhat larger proportion of deaths in elder life than really belongs to Early Death Claims; still, as we know, the number of those who enter at late ages is usually small, and it will have little appreciable effect upon the statistics. [In the Table the numbers have been adjusted according to the revised limits, and are accurate, with the slight exception noted under Series II.]

Series I. contains a large proportion of total abstainers; roughly speaking, I should think one-half of the cases. It will be noticed that in this series no death was directly attributed to alcohol or cirrhosis of the liver, although no doubt there were, as in all the series, many deaths indirectly due to alcohol, but not so reported.

I have thought it better to put down the actual numbers of deaths rather than percentages, with a view to make the record such as could be added to in future. I may add one word with regard to Series III., which comprises the experience of an office from its commencement in this country, 13 years ago, with a constantly increasing business.

Such a series will naturally contain an undue proportion of very recent policies; that is to say, the recent policies at risk were in much greater number in proportion to the total policies at risk than in the case of the other series, which were taken out of the current experiences of offices which had been long at work. When considering the third series it must, therefore, be borne in mind that it contains a much larger number of recent policies. One would expect on that account the less preventible deaths to be in excess, and so they appear to be in the tables.

Sir Hugh Beevor, Bart.: I have no right to open the discussion, because I was not expecting to do so. I had hoped to have heard what Dr. Glover Lyon, who is very interested in this paper, had to say, and also Dr. Vivian Poore. I am very pleased indeed with the précis of the paper which we have heard to-night, because the facts, put together in that form, more than equals the value of three papers, taken separately. I think we have to thank Dr. Hingston Fox for the development of the character of our society by compiling this précis, for he has reduced order out of what would otherwise have been chaos. This collaboration alone justifies the existence of the society, and I hope it is the first step to many future collaborations which will be extremely valuable records. It is not fair, that after doing so much, one should ask for more, especially when I myself am not in the position to assist; but I would point out that the value of this précis, when it is placed upon the records of this society, will be trebled if the ages at death can be stated. There is a great difference in the figures in the series. In all probability the heavy figure of 28 in the third series, placed against "other acute specific fevers," and which is eight-fold the number in the second series, is to be accounted for, as Dr. Hingston Fox has said, from these being quite early death claims for a large number of new policies, so that there are a large number of people dying from typhoid fever and diphtheria, which is much more fatal at early ages. If age in decennia is not added,

the figures can only be used to a very small degree. It is not fair to ask for more, but still, such an addition would immensely enhance the value of the paper. In considering the papers before me, which have interested me very much, I have tried to consider them by a standard. Anybody looking at this précis will rightly say it is a collection of isolated facts which give the causes of death, and help one to understand what are the early death claims, but that nothing can be known about mortality, because it is impossible to extract it from these data. The series of figures in the third paper is written down as percentages of deaths, so that it is very easily read. I have been comparing those figures with the standard of the Registrar-General, which was the standard of the whole experience of England, 1891-2, for occupied males. The proportion of deaths, taking the Registrar-General's Return, can be seen for occupied males, and can be compared as a standard with this total experience, which is what I would particularly speak of, this combination of the three series of early death claims. Comparison is of course very vague. The mere fact that something like 10 per cent. of the number of early deaths in the third series consist of acute specific fevers, the percentage being based on those deaths, and also saying, for the sake of argument, that the next series has none, then all the other deaths which come in the third series are of course affected by this very large factor of there being 10 per cent. of the deaths due to specific fevers. So when you are speaking of percentages of deaths, you have always to remember the other causes of death at the same time. Bearing these differences generally in mind, in the main we can, with that reservation, make a rough comparison with the standard of the Registrar-General. I was extremely surprised, when I looked with interest to the Registrar-General's percentage of deaths from alcoholism and cirrhosis of the liver, to find it stated at a little over 3, and when I turn to this table, to these total figures, I found it was equally high. On looking into this paper, what seems to run all through it is this —that naturally much of the early death claims, the unexpected

death claims, would come under the head of alcoholism. The causes of death which are in excess being alcoholic cases which are not referred to, cirrhosis or alcoholism and such are likely to be early death claims. At the same time, it seems to me that Dr. Hingston Fox, in taking the classification of "Causes less preventable," "Causes doubtfully preventable," and "Causes more preventable," is open to a considerable amount of criticism which I shall not enter into in detail. It is very singular that when I come to the causes which are more preventable in his classification, and compare them with the Registrar-General's figures, that I find such things as kidney disease, acute and chronic, about one-third higher in his calculation than in that of the Registrar-General. That must be because kidney disease is likely to come among the early death claims, especially with alcoholism; at least that is my only explanation of it. I should be glad to hear if there is any different explanation. In percentage of deaths the figure of the Registrar-General for occupied males is 4·4, while in the paper it is 6·2.

Dr. Hingston Fox: Are the figures of the Registrar-General for the whole population—men, women, and children?

Sir Hugh Beevor: No. The figures only apply to 400,000 deaths among males, from the ages of 15 to 75. Women and children are not included. Then I turn to the next heading, "Doubtfully preventable," which shows another way of looking at this paper. Under the heading of malignant disease I find that the figure in the paper is about 7·5 per cent., whilst it is 4·3 if you take the whole of the males or occupied males—whichever you please. What does that mean? Does it mean this: that the high rate of malignant disease is evidence of the very great saving to the offices by insurance examination; that the proportion of deaths by malignant disease is excessively high because it is not a disease which can be readily prevented or foretold. I cannot understand why

there should be in each of these returns a much heavier series of deaths from malignant disease than that which is met with in the general population unless it was that malignant diseases could not be eliminated by medical examination, which could eliminate other causes of death and so as a percentage it appeared at a much higher figure. It has been of very great value to us to read these papers, and to see the special precautions which have been taken by the readers of the papers in presenting us with the figures. I do not intend to say anything in the way of comparing the different series, but I again point out that if we knew the ages at death it would account perhaps for many of the great differences in the returns in the different series. I would ask Dr. Hingston Fox whether when he put cerebral hæmorrhage under the heading of vascular disease, he did not think that it might not equally well come under nervous lesions. We know pathologically that it is vascular disease, but practically we know that the man who undergoes great cerebral activity, and who exercises his brain much is specially liable to suffer from apoplexy.

I will say, in conclusion, that I am very much obliged to these members of our society for having brought forward these figures, and for having set them down in this table in such a manner that one can always refer to them in future.

Dr. Lubbock: I am exceedingly sorry that I was unable to be present at the last meeting of the Association, but I read with great interest the paper of Dr. Fox and the remarks which were made upon that occasion. The subject of early death claims is certainly most interesting on account of the medical knowledge which it conveys to us. It is also most important because it deals with the principal danger which the medical officers of the different Insurance Companies are expected to counteract. We are naturally pleased when a person is insured at our office at the ordinary rate, but if he dies within a few months we feel that we may have been guilty of

examining him without thoroughness, and of not having found some indication of the disease which has been the cause of his death. It seemed to me, however, that the figures connected with early death claims would be even more interesting if they were somewhat fuller, that is to say, if they enabled us to know the whole medical history of each claimant, his family history, his habits, his weight and height, the state of his different organs, the age at which he died, the rate at which the insurance was effected and the cause of death. I, therefore, asked the actuary of the insurance office to which I belong whether I could obtain a list of the early death claims which had occurred during the last few years. Upon the next day he gave me a list of some 190 cases with the cause of death specified, but without any particular facts about the persons themselves. I would just observe that of these 190 cases, 16 were due to accident, 3 to suicide, 17 to infectious fever, out of which 10 were due to enteric, 26 to acute inflammation, 17 to pneumonia, 12 to malignant disease, 35 to tubercular disease, 6 to general disease, 5 to diabetes, 29 to diseases connected with the circulation, 31 to diseases of the nervous system, 6 to diseases of the liver, and the rest to other causes, such as gastric ulcer, senile decay, influenza, and so on. It seemed to me that it would be very interesting to have more particulars of these cases, and to place in a tabular form special facts about each of them. Certain abbreviations were of course necessary, but there need merely be such as are habituall used, such as M. for mother, F. for father, S. for son, D. for daughter, and so on, which, if brought into the tables, would enable far less space to be occupied. Having understood that the next meeting would not take place until January, I have not unfortunately been able to complete the 190 cases mentioned, but will put before you a few of those which are already done, and should be glad to have your opinion whether the way in which I have arranged them is the best. In the first column I put the number 1, 2, or 3; in the second, the duration of the insurance in years, that is to say, if I put ($^1/_{12}$) this means $^1/_{12}$th of a year, *i.e.*, a month, while (1)

means a year, (2) 2 years and so on. This is followed by the age, sex, and profession, the family history (the abbreviations F. for father, M. for mother, B. for brother, S. for sister, D. for died, and so on, being used). A personal history of the applicant follows, his habits, his general appearance, his height and weight, his present condition as regards the heart, lungs, urine, and so on, and last of all the rate of insurance, and cause of death. These particulars I have obtained from the medical report, death certificate, and other papers in each case. The cases are arranged in order, the deaths from accident coming first, then the deaths from suicide, then those from acute specific fever pneumonia, and so on, the particulars being given in each case so that any one can learn the whole history of the claimant, and make his own deductions. I have sub-divided the groups according to the duration of the insurance, in years. If the insurance was for a month it is put down as one-twelfth of a year, if for one year as one, if for two years as two, and so on. In that manner we obtain a more or less full history of the man's medical life, which enables us to interpret to a greater extent anything which might have been discovered during the examination. I should have been glad to make a few observations about these cases. The important fact connected with this question is naturally to have a large number of them and to know as much as possible about each one and the cause of death. The cause in most of the above cases is taken from the death certificate, which unfortunately is by no means as trustworthy in all cases as it might be. With regard to the accidents it is often very difficult to distinguish them from suicides. A case is brought in as accidental death, but when you study the medical history you find perhaps that a near relation has committed suicide. One case mentioned in the list is that of a person who poisoned himself accidentally by taking a solution containing cyanide of potassium. He was supposed to have done this quite accidentally, but on looking up the family history, we find that his sister had committed suicide previously, and so one was driven to the

conclusion that in all probability this was a similar case. Dr Hingston Fox made some interesting remarks at the last meeting about accidents, pointing out that there seemed to be in some cases a family tendency to them, or perhaps a vice of constitution or habits which renders accidents fatal. Even in the case of deaths in battle, the recovery from wounds which is said to be more frequent in a victorious than in a defeated army, may be dependent to a great extent upon the previous constitution and habits. In the cases which I have described only two deaths were attributed to alcoholism. Upon looking into the facts, however, one finds that death was frequently ascribed to gastritis, cirrhosis of the liver, or some other result of alcoholism, and although the name itself was not used, one suspects that in many cases it was the real cause of death. If it is thought right that the observations which I have prepared should be added to the papers already read, I would ask leave to be allowed the time necessary for finishing the 190 cases. I have described perhaps 100, and should be very pleased to complete them if they might be added to the valuable papers which have been read.

The Chairman: This is a very valuable suggestion, and I feel sure that the Council will take the matter into consideration.

Dr. Colcott Fox: I have here a book to which I beg to call your attention. It is a volume containing a report on the mortality of the Mutual Life Assurance Company of New York for 56 years, giving the details of 46,525 deaths. It is a very elaborate work, and I think you will find it an extremely valuable one.

With regard to medical selection protecting offices for about seven years, no doubt by the careful selection of lives there is a further protection for many years after that. Dr. Hingston Fox made a remark with regard to the way in which the certified cause of death is secured by the offices. I believe the practice differs in different offices, but the certified cause comes before me in two forms, viz.,

a death certificate supplied by the deceased's representatives, and a copy of the certificate supplied to the Registrar-General. It is interesting to note discrepancies between the two, and to observe a bias on the part of the doctor when acting in the family interest. Even in the Registrar-General's certificate, according to our present system, we are far from getting full information in many cases as to the exact causes of death. There are grounds for believing that where alcoholism, syphilis, cancer, and consumption are in action, the feelings of deceased's family are studied. The term pernicious anæmia I come to look on with some suspicion.

Dr. Newton Pitt made a remark about a suicide clause, and I understood him to say he thought it was rather useless putting in a clause to protect offices against suicide because the list was so small. I think, on the whole, that offices ought to have the protection of a clause of that kind against suicides for the first two years.

The division of the ages at death into below 45 and above 45, brings out, as we might expect, the most potent causes of early death in those entering in young adult life and the chief causes in operation after 45 years. For instance, Dr. Hingston Fox shows that the most potent causes in those entering in young adult life are tuberculosis, suicide, acute inflammation, chiefly pneumonia, appendicitis, and acute specific fevers, and Dr. Newton Pitt mentions consumption and alcohol, the latter of which Dr. Hingston Fox has explained does not come into operation so much in his office. He also mentioned vascular lesions, which I do not recognise in such a large proportion in the figures given by Dr. Carruthers and myself. Then after 45 we get the degenerate lesions, chiefly connected with the vascular system. Dr. Hingston Fox went on to ask whether we could protect the office by the further weeding out of those applicants who show signs of weakness at entry. I think a great deal can be done in this way. No doubt there are different

traditions in different offices, and further, weak lives are deliberately accepted in some offices on special terms. The particular office for which I have the honour to act is, I think, particular about these matters. We do not take, and it ought to be considered in looking at our figures, any applicant with a recognised organic disease, such as valvular disease of the heart; we do not speculate in the life at all. Doubtless the gentlemen here are familiar with a report issued by my office, dealing with the question of tuberculosis in relation with the weight and family history. Where there is a family history of tuberculosis, and the applicant is under weight, we think he is more likely to contract tuberculosis.

Again, before recommending an applicant who furnishes an albuminous—or sugary, or very low or high specific gravity—urine, I always seek to assure myself that the abnormality is a passing one, and that the habits are good. This necessitates a good deal of trouble, but I have rarely found difficulty in carrying it out.

I have on another occasion communicated my views on the subject of syphilis, to which I attach what some may think an exaggerated importance. I do not think we find "general paralysis of insane" so frequent a cause of death as it appears to be in other tables.

When an applicant comes for examination suffering from some ailment, even if apparently trivial, he should be postponed, for it is a rough rule of some importance that if the ailment is trivial he can soon get rid of it, and if he cannot do so the ailment is of more or less importance. In the figures before us the influence o alcoholism is very conspicuous, but it is certain that its remote effects are still more patent. One of the most important problems set us is to find out what the habits of applicants in respect to alcohol are. If I have the least suspicion I make the most careful enquiries into the applicant's habits.

I should, in conclusion, like to express my gratitude to Dr. Hingston Fox for the very candid way in which he supplied a

detailed list of all the cases which he had personally examined, and for the criticism he directed upon himself. I have a feeling that I should rather like to share that position with him. Of the death claims that are included in our table I examined 53 of the applicants myself. In looking through them I am gratified to find very little for which to blame myself. The only ones in which I might perhaps have been more careful are the cases of tuberculosis. Of the 11 cases of tuberculosis, 6 were distinctly under weight, and several of them, I find in reading over their histories, had a distinctly poor family history, while two of them suffered from pleurisy previously, which is a very important point. With regard to heart disease, I confess to an uncomfortable feeling concerning one case. I had to examine a gentleman of considerable importance in the City, an exceedingly busy financier, excited and restless, who was in a partially partitioned office, with all sorts of people calling and some talking to him, and with telephones and typewriters making a great noise. In fact there was a perfect Babel. Two years after his acceptance he died of aortic disease.

Dr. Hector Mackenzie: There are a few remarks I should like to make with regard to the very interesting table which Dr. Hingston Fox has compiled from these three series. There are certain peculiarities which come out on comparing three series together which I must say are a little difficult for me to understand. I do not consider Sir Hugh Beevor's explanation altogether satisfactory, for this reason, that while Series III. differs only to a very slight degree from Series I. it differs very widely from Series II. For instance, if we take fevers we find that in Series II. there are only 22 deaths from typhoid and other specific fevers, making 5·5 per cent. of the total number of deaths, while in Series III. there are as many as 52, or nearly 15 per cent. That is a very striking contrast between Series II. and Series III., but in Series I. we have 16 deaths from typhoid and other fevers, or 12½ per cent., very nearly as large a proportion as in Series III.

Sir HUGH BEEVOR: I was always speaking of the whole lump when I said percentage.

Dr. HECTOR MACKENZIE: Then there is a great contrast in the deaths from pneumonia and other respiratory diseases. We find that in Series II. there are 63 deaths from pneumonia and other respiratory diseases, amounting to over 15 per cent. of the deaths in that series. In Series III. there are only 32 deaths from pneumonia and other respiratory diseases, or 9 per cent. I cannot say that I quite see why, in one Series, there should be so many deaths from fevers and in the other so many deaths from diseases of the respiratory system.

Sir HUGH BEEVOR: You must take the whole number of deaths, surely, for the percentages. If you take your percentage from the figures at the end you will find pneumonia is about equal.

Dr. HECTOR MACKENZIE: That is what I have done. I took them from the whole number. There are 32 deaths from pneumonia and other respiratory diseases in Series III. out of 344. In the case of kidney diseases we find that Series I. and Series III. correspond, both being 5 per cent., whereas in Series II. there are 33 deaths, or 8 per cent.; that is to say, in Dr. Newton Pitt's Series there is an excessive number of deaths from kidney disease as well as from pneumonia. Dr. Colcott Fox said that in his group the smaller number of deaths from diseases of the vascular system was probably on account of the refusing by his office of all cases of organic disease, but on going into the figures I do not think there is a smaller proportion of deaths from disease of the vascular system in his series. In fact, if you take the heading "diseases of the heart," you will find very nearly the same proportion dying in his series from heart disease as in Dr. Newton Pitt's. In Dr. Newton Pitt's series there are 35 deaths from heart disease, giving 8·75 per cent., and in Series III. there are 28, which is 8·1 per cent. I do not know whether Dr.

Colcott Fox will be able to explain that later on. In Dr. Hingston Fox's series the number of deaths from heart disease amount to 7 per cent., which is a little less than in Dr. Colcott Fox's and Dr. Carruthers' series, after their careful rejection of cases of organic disease of the heart.

The PRESIDENT: I venture to say a few words before we close this dircussion, which has been so useful and fruitful to us all. I asked Mr. John Spencer, F.I.A., of my office, the English and Scottish, to see whether he could obtain a few figures for me on the basis of the papers that have been read. He has devoted much time and trouble to the collection of data, and has supplied particulars of 100 deaths which occurred within ten years of the date of insurance. It was very interesting to see how close the figures came to those of Dr. Hingston Fox, though of course the figures are not sufficiently numerous to furnish reliable averages. Certainly the number of accidents in my case was very much less than in Dr. Fox's. I only had two in the 100. With regard to the suicides there was only one gentleman who had committed that happy dispatch. Typhoid fever was almost exactly the same as Dr. Hingston Fox, five per hundred as against six in 128. Pneumonia was 7 per cent. as against his twelve in 128. As regards diseases of the liver, not cirrhosis, the proportion was 3 per cent. I will not go into all the figures, but just select one or two. For malignant diseases it was 8 per cent., and for tubercular diseases 17 per cent. That again is rather lower than Dr. Fox's. Kidney disease was about the same, 7 per cent., heart disease 11 per cent, and acute rheumatism 2 per cent. In cerebral affections most of the cases were apoplexy. I was obliged to include under that heading one case of sunstroke, which I could not classify in any other way. The deaths under that heading amounted altogether to 13 per cent. Lastly, alcoholism and cirrhosis of the liver accounted for 8 per cent. I quite agree with what has been said that it is incorrect to put only that figure down for alcoholism:

my impression is that most of the cases of kidney diseases, as far as I can remember, were distinctly due to alcoholism. Two cases I could not classify at all. One of the men actually died of gout. I do not know whether he ought to have been allowed to die of gout, but he was put down as dying from that complaint. Then there was a case of septicæmia, but except for these two I could easily classify the cases under Dr. Hingston Fox's admirable headings. The average age at death in these 100 cases was 45·1. You will notice that the deaths from tubercular causes accounted for the largest class of persons in my calculation, and they were also by far the largest in Dr. Hingston Fox's series. That is a very awkward thing. We ought to be able to find out some of them. No doubt some of them are cases of acute phthisis that spring up rapidly. There was one case particularly in which the disease had only had two or three months' duration, so that we could not quite blame ourselves there. But the others ought to make us look a little sharply after our examinations.

I was rather astonished to hear Dr. Colcott Fox say that his office declined to take cases where there was mitral disease, whether stenosis or regurgitation, because as I have said before at this Society, and as others have said more strongly than I, if you get a well-compensated case of mitral regurgitation, and the patient knows it, it is a very good life. The patient takes precious care of himself, and a large number of men of that type reach a very ripe old age. Most of you remember that famous case which Sir Andrew Clark used to quote, of the Chaplain of the London Hospital, who died of mitral regurgitation at the ripe age of 92. He was appointed to a living just to fill the place till a younger man was ready, but he stopped there till the end of his life, surviving the younger man, and did not die when he was expected to. I have known several other cases like that. When I see a case of that sort I carefully investigate whether the patient has proper cardiac compensation, whether the general condition is good, and then I recommend the office to accept

him or her at some considerable extra, but certainly not to reject the candidate.

Another subject that Dr. Colcott Fox alluded to was the low specific gravity of urine. That is one of the most unsatisfactory features of examination. I am sure many of those who are present will agree with me there. The candidates, either male or female, come to the office in an awful fright. You ask them to pass water and they pass water of very low specific gravity. I believe it is water of the same type that is passed by candidates under examination at the College of Surgeons, which has a certain name. I never go by specific gravity; it is absurd to do so under the circumstances. Candidates that I know are perfectly healthy, with whom I am personally acquainted, on being examined under those circumstances, have passed urine of a specific gravity of very often 1007 or something of that sort. To reject them would be absurd. It may be said "They must come again," but you cannot get candidates to come frequently, and you will find they very often object, and thus the office would lose a great deal of business. In a great number of cases I do not record the specific gravity, because, under the circumstances, it is untrustworthy. No doubt it is a difficulty. I quite agree with what has been said in this admirable précis, which has put the chief points of the three papers before us in such a way that we can properly discuss them. All of the papers have taught us a great deal. I have learned from each paper much that I shall take to heart, and I am sure we are very much indebted to the authors for the trouble they have taken. The discussion has been as good as the papers. Some of the facts that have come out in the speeches will help us very much in our work.

Dr. Hingston Fox in reply, after thanking the Members for their indulgent reception of his paper, said with regard to what Sir Hugh Beevor remarked, I should like very much to know how he would

introduce the element of age into a table of this kind. It is difficult, without making the table very long, to put in ages for these deaths.

Sir HUGH BEEVOR: You have a certain number of ages in this first list. I suggested that they should be divided into decennia.

Dr. HINGSTON FOX: Then Sir Hugh Beevor entered into a comparison between the figures given in the tables and those of the Registrar-General. The Registrar-General's figures were the mortality of occupied males between the ages of 15 and 70, and are strictly comparable with our own, but it must be remembered that the method of quoting, for the several causes of death, percentages of the total number of deaths is not really a scientific method: it is not to be compared for a moment with that of calculating the mortality upon a certain number of lives at risk. The total deaths from all causes may, in one population, be very different from the total in another, and so the percentage of such deaths ascribed to a particular cause may vary, although the actual number of deaths in proportion to the living may be exactly the same.

Sir HUGH BEEVOR: I apologised for bringing forward the percentage figure—it was because it was impossible to get mortality figures.

Dr. HINGSTON FOX: It vitiates the comparison with the Registration statistics. If I understood Sir Hugh aright, I agree with him in the explanation, that we, by medical examination, eliminate a great many deaths, more especially those from tubercular disease, which is the cause of death most influenced by medical examination. If Sir Hugh had given us the proportion of deaths of occupied males from tubercle in the Registrar-General's Returns, it would have been, I imagine, larger than the figure which appears in our own list.

Sir HUGH BEEVOR: It is not quite comparable, because you have not phthisis for a heading. It stands at about 12 to 15.

Dr. HINGSTON FOX: Does that include all tubercular cases as well as phthisis, because they are all included in our tables?

Sir HUGH BEEVOR: Then I cannot compare them fully.

Dr. HINGSTON FOX: If some causes, such as tubercle are much reduced by medical examination, then the other causes must be correspondingly raised, hecause you have to make up the 100 per cent. of deaths from some cause or other. Dr. Lubbock's records are very interesting, and if it were possible to make a table of a sufficient number of cases with that amount of detail, it would certainly be of value. With regard to Dr. Colcott Fox's remarks, there were many points in them which commanded my agreement, and I beg to thank him and the other speakers for their appreciative expressions.

Dr. NEWTON PITT, in reply, said: I cannot say how very much I am indebted to Dr. Hingston Fox for the great trouble he has taken in making up these tables. He was good enough to go through mine, and to add several details so as to make it comparable with his own. The question I should like to put to him is, "May not the marked differences in the causes of death in our two papers be not merely a question as to the proportion of deaths which are due to alcohol, but that the type of individual who is a total abstainer is of a different physique and very often is a different individual from the man who is a moderate drinker. Personally my experience is that the average individual who is a moderate drinker has a better physique than a man who is a total abstainer, and has infinitely better health than the man who is a drunkard or even a temperate intemperate man. It certainly does strike me as remarkable that there should be so large a proportion of cases of tuberculous disease in his tables, although, of course, attention must be paid to Dr. Hingston Fox's argument that the percentage of deaths from any one cause depends partly upon the increase or diminution of deaths from other causes. Hence not merely the

percentage of deaths from each cause is required, but also what proportion they form of those living. It is most desirable, if it be possible, for the three authors to add to the statistics the number of cases at risk. It is impossible to furnish an accurate statement, but we might give a rough number which would represent the number of cases that we had at risk during the years to which these tables apply. It cannot be absolutely accurate, but it may be sufficiently near to be of some value.

The points that Dr. Colcott Fox brought forward were interesting. With regard to the question of heart disease, it seems to me, as Dr. Mackenzie pointed out, that practically the porportion comes out about the same in the various tables. I would also suggest that vascular disease includes a very large number of cases of degeneration, which occur chiefly in the older policies. As the Company referred to has only 13 years' English experience, the proportion of young lives is evidently greater than in the other Companies, and when the office has a greater proportion of older lives I do not think there will be any difference. With regard to the question of the acceptation of an applicant with heart disease, of course scarcely any case of aortic disease is taken, although a few cases of well compensated mitral disease are taken with an extra rating. Looking through the cases in the period discussed, so far as I recollect there was not a single accepted case of heart disease, which had been rated up, which occurs among the deaths, so that there was no single case among this series which at the time of examination gave any evidence of heart disease. I would also suggest that heart disease is a most misleading term. Heart disease after 45 is kidney disease, and the great majority of cases that are signed up as heart disease, if the age is 50 or over, are cases of cardiac failure, following upon vascular and degenerative changes often due to kidney mischief.

With regard to the question of syphilis, the rule in the Office with which I have the honor of being associated is never to accept

cases until two or three years have passed without any symptoms. I would call Dr. Colcott Fox's attention to the fact that the numbers of cases from general paralysis of insane, which are practically synonymous with syphilis, are in List No. 1 two, in List No. 2 seven, and in List No. 3 eight, so that he is an easy victor. I have been particularly struck in Dr. Hingston Fox's results with the small number of cases of cirrhosis of the liver and alcoholism. As he points out, the small mortality from kidney disease and from pneumonia do form a very strong argument in favour of total abstainers, and there is no doubt extreme difficulty with such methods as can be adopted in Life Insurance in eliminating from among the moderate drinkers the intemperate men who are but rarely drunk; in fact, it is almost impossible. I should certainly like to add to these figures, in order to discuss them more accurately, a rough estimate so far as we can ascertain it, of the number of cases at risk.

Before sitting down, I should like to put before the Society this question:—Supposing any more tables on this subject are drawn up, what is the exact form of tabulation the Society would suggest as being the most desirable? I feel very strongly that a great deal is to be learned from dividing cases up into those under the age of 45, and those over the age of 45, or at any rate classifying them in some similar way. It may be that they should be classified between the ages of 25 and 35, 35 and 45 and so on, so as to be comparable with the Registrar-General's Returns, or it may be desirable that we should fix other age divisions. I should therefore like the Society, if possible, to express an authoritative opinion as to exactly what age limits would be desirable, if further tables are drawn up.

As to the periods after a Policy is taken out, which should be discussed, it is not much more trouble, and it brings out several interesting facts to separate those cases which die within two years

of examination. I agree with Dr. Hingston Fox that the period of ten years is too long for those dying over 45, and that a shorter period, say, seven years, in future should be taken for such cases, and ten years for those under 45.

Dr. Carruthers: I should like to make a remark on one or two points. One of the principal points is the question of the proportion of heart disease in our tables. I regret greatly that in drawing up the tables—I take the whole blame myself because it does not rest with Dr. Colcott Fox—I omitted to take into account the valuable restriction in regard to older cases that Dr. Hingston Fox drew up. The result is, of course, that we have included deaths of people over 50 years of age in whom the insurance had exceeded half their expectation of life. [These have been omitted from the revised table.] A number of these heart cases are really senile heart and fatty degeneration, as is borne out by the fact that of them less than half were valvular—12 were valvular and 15 non-valvular; and our heart figures have thus a more unfavourable aspect, owing to our not adopting the method of selection taken by Dr. Hingston Fox and Dr. Newton Pitt. I was glad to find that Dr. Hingston Fox observed an important character of our statistics, that owing to their covering the whole period during which our office has been in existence in this country we had a larger proportion of what he has called the "Less preventable causes o death." That will account for the big proportion of fevers to which Dr. Mackenzie called attention. But I am bound to say that I should have expected it to account for a large proportion of pneumonia cases also, whereas Dr. Mackenzie has pointed out that we have a smaller number. That is undoubtedly a puzzle to me. The whole question of pneumonia is one that I think we have hardly faced to-night. There seems to be a general impression that pneumonia ought to go among the preventable causes of death because of its being so largely alcoholic. Personally I speak with great diffidence in the face of men of infinitely larger experience than myself, but I

feel that while this is a true view of hospital cases, these alcoholic fatal pneumonias do not form so large a proportion in private practice, and perhaps too much weight is attached to alcohol as a factor in deaths from acute pneumonia. I had considered it as cognate to the acute specific fevers.

In regard to the question of low specific gravity of urine to which the President referred, I would point out that Dr. Colcott Fox only referred to continued low specific gravity. We often obtain a low specific gravity specimen to begin with, but we try to obtain others at different times of the day so as to get a normal specific gravity, and to eliminate "nervous urine" from the question. One very important matter has been referred to by several speakers—the true mortality—that is, the proportion of deaths to cases at risk. Before beginning work on this paper I had a talk with the actuary at our office, and he informed me that it would be a task of enormous complexity, in our office at any rate, to get out these figures, that it was almost impossible to get them out with the accuracy that he could desire. We are at the present moment compiling our records on cards, and when those are completed it might be easier to obtain the true mortality figures, but I am afraid there will even then be serious practical difficulties. That being so we adopted this death percentage (*chiffre lethale*) as the best remaining method.

There is one other thing which—if the Association does not think I am taking too much on myself—I should like to suggest. I hesitated to do so, being a very junior member; but Dr. Pitt has broken the ice for me. There are a great many minor points in classification on which the three papers have taken different lines. We cannot decide upon these points efficiently to-night, but as the Association looks forward to the recording of a large number of statistics on similar lines in the future, I would venture to suggest that it might be a very good thing if a committee of the more

experienced members of the Association were to consider (1) the division according to age, (2) the length of insurance that should be included under "Early death claims," and (3) whether that should be sub-divided into smaller periods, as was done in Dr. Pitt's paper and our own. The committee might also consider other small details in regard to the classification which Dr. Hingston Fox has carried out with extreme care, but which he himself admits is open to discussion and to difference of opinion on one or two points.

FATNESS,* OVERWEIGHT, AND LIFE ASSURANCE.

BY

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These remarks, written at rather short notice, will, I hope, be regarded merely as an attempt to introduce a discussion.

Obesity, according to the definition which I prefer, is a state of the body characterised by an *excessive* amount of fatty tissue, chiefly in the situations where it is normally most abundant. To estimate correctly the degree of obesity merely by the relation of weight to height is obviously not, strictly speaking, practical, because the relation of the amount of fat to the size of the muscles and bones is not thereby taken into consideration. Moreover, variations in the proportion of weight to height, either in the direction of leanness or obesity, differ in regard to their pathological significance probably not only according to age and sex, but also according to race and family, and according to mode of life. A temperate man, who by an active life in the open air, maintains the functions of all his organs, may be expected not to suffer from an amount of fat which might be detrimental were he living a sedentary life in town. Such points can, of course, be better estimated by the medical officer who personally examines the applicant for life insurance than by one who has to rely on mere figures and written answers to questions.

* I here employ the word Fatness instead of Obesity, because, according to some definitions, the latter term has a more restricted meaning than I am inclined to give it.

In obesity, as in other morbid conditions, a given exciting cause has a more injurious effect in some individuals than in others. Thus some persons, however much they eat and drink, never become fat, whilst in others "everything they take turns to fat," though they have not particularly good appetites and are not indolent. The defective state of the metabolic functions, which, in association with *relative* excess of food leads to obesity, may be due not only to hereditary influences, want of exercise and habitual disturbance of the metabolic functions from alcoholic drinks, but also occasionally to relatively transient causes. For instance, cases have been known to follow typhoid and other fevers, severe hæmorrhages and privations such as those experienced during prolonged sieges. Nervous conditions have some influence in regard to obesity as they notoriously have in gout and diabetes. Constant anxiety, grief and worry tend usually to leanness, whilst equanimity and a habitual "comfortable" frame of mind are more likely to be associated with obesity. It is possible, however, as suggested to me by Dr. R. Bowles, that in some of the cases formerly thought to illustrate the connection of obesity with mental inactivity, there was really a myxœdematous element present. The associations of obesity with disordered functions of the sexual organs and occasionally of the thyroid gland are, of course, well recognised.

We may here remark that the extremes in regard to weight, unlike the extremes in regard to height, seem to be very rarely associated with congenital abnormalities in the structure of the body.

We are, I suppose, all agreed that obesity tends to shorten life. In a well-known English text-book* we read: "No good insurance office will accept at ordinary rates the life of a man whose weight bears more than a certain proportion to his height. It is notorious that such persons bear even slight accidents badly, and succumb to illnesses that would be unattended with danger in healthy subjects." Sir Dyce Duckworth writes: †"Obesity is

* FAGGE'S "Principles and Practice of Medicine." First Edition. 1886. Vol. II., page 311.

† ALLBUTT'S "System of Medicine." Vol. IV., page 615.

recognised by medical officers for life assurance as an indication of imperfect health. If the body-weight bear an undue proportion to the height of the individual, such cases are either 'loaded' or declined as second or third class lives. Obese persons bear accidents badly, are unsatisfactory subjects for surgical operations, and are apt to succumb to serious illnesses." The weight and relative helplessness of obese patients tend to hinder physical examination and in various ways obscure the diagnosis, whilst their vast accumulations of fat increase, partly mechanically, the difficulty of medical and surgical treatment. Dr. W. H. Allchin* observes that acute diseases in an obese subject run "a singularly unfavourable course. The diminished power of heat radiation increases the pyrexia; and the weak heart favours the establishment of the adynamic state. Such means for lowering the temperature as cold applications have but little effect through the thick fat; and aconite is contra-indicated by the pulse. But since the oxidising process in the corpulent is diminished, the temperature in the febrile state is rarely very high, and at the same time is but ill resisted."

Dr. Shepherd,† in a paper on "The Relation of Build to Longevity," 1899, concludes that "overweights are poor risks, because (1) they are abnormal; (2) they are prone to develop heart disease, apoplexy, and premature arteriosclerosis; (3) they are peculiarly liable to diabetes, rheumatism, and lithæmia; (4) they take insufficient exercise and eat heartily, as a rule, and frequently are intemperate in the use of stimulants, particularly of malt liquors; (5) they succumb easily to accidents and surgical operations." He tabulates the experience of the Connecticut Mutual Life Insurance Company from 1846 to 1895, showing percentage of deaths amongst 26,222 dying from all causes, classed as overweights and underweights (that is by as much as 20 per cent. of the normal weight or more). The tables show that whilst more than half of

* QUAIN'S "Dictionary of Medicine." 1894. Vol. II., page 250.

† Quoted by Dr. C. L. GREENE, "The Medical Examination for Life Insurance." 1901, Page 129,

the underweights died of tuberculosis, respiratory and nervous diseases, "a marked majority of overweights died of nervous, circulatory, kidney and respiratory diseases," 28 per cent. of all the deaths from diabetes being found amongst the overweights and not one among the underweights.

However, corpulent persons do sometimes last out to a good old age, and quite excessively obese individuals may live to between 50 and 70. Dr. George Cheyne* (1671-1743) at one time weighed 32 stone, but by diet, &c., reduced his weight by nearly one-third, and lived 72 years. Even Daniel Lambert was about 40 when he died; at which time he weighed nearly 53 stone.

The question of the amount of "loading" required for the lives of obese persons brings us to the following eight points, the consideration of which constitutes the chief part of my paper.

1. Weight Measurements and Relation of Weight to Height in Fat Persons.

In all probability the chances of longevity are greater amongst persons of medium height than amongst very tall persons,† say over 6 ft. 1 in. Excessively tall persons ("giants") are notoriously short-lived. Probably, therefore, a very tall fat man is likely to die earlier than a short fat man, though the ratio of weight to height be the same in both cases.

I believe myself that very great body-weight somewhat lessens the chances of longevity even in muscular big-boned men, in whom the relative proportion of fat, muscle and bone is normal. The "beefy" men of Herculean build and great strength of muscle, though they may be rightly termed *exceptionally fine men*, have not the best chance of longevity, independently of the fact that they are specially prone to lay on fat if they give up active habits.

The value of a relatively large weight to height ratio when there is a supposed tendency to tuberculosis will be alluded to later on.

* See William Wadd, "Cursory Remarks on Corpulence." Third Edition. London, 1816. Page 47. See also Dr. J. F. Payne's Biographical Notice in the "Dictionary of National Biography." Vol. X., page 217.

† See the note on a Report by Dr. M. E. Moss and a Committee in the Philadelphia Medical Journal," 8th December, 1900, page 1074.

In cases of fatness, evidence of *constantly increasing weight* is as important as is evidence of constantly decreasing weight in cases where consumption or malignant growths are suspected.

The abdominal and thoracic girth measurements should supplement the evidence of fatness derived from the weight and height measurements, but we shall refer to this point in another place.

The question of how much variation from the normal weight and height ratio can occur without diminishing the chances of longevity is a difficult subject. The general appearance, strength and activity of the applicant must be taken into consideration, as well as his family history (and race) and his habits, and whether his weight appears to be stationary, or decreasing, or increasing.

Dr. C. L. Greene,* who gives tabular results of recent American investigations regarding the standard weight and height measurements, says:—"Roughly speaking, a man five feet eight inches in height should weigh from 150 to 162 pounds according to age; and for each inch above or below this height five pounds should be added or subtracted." . . . The "allowable variation is greater upon the side of over-weight than of under-weight. If the applicant's family and personal health record be above suspicion, 20 per cent. more or less than the average weight is allowed by every company. Some have in the past allowed 25 per cent. under-weight; and one or two 45 to 50 per cent. over-weight, under the same restrictions. It is difficult to decide what the proper figures should be, and any rule must be subject to an occasional exception, but at present the tendency is in the direction of greater conservatism." . . . . "Generally speaking, it may be said that if a man be thick-set, hard, muscular and big-boned, his personal and family history above suspicion, his habits temperate and his digestion good, his waist measurement less than that of his chest, he may safely be allowed a margin of from 25 to 30 per cent. above the tabular weight. Anything more should call for special rating or endowment policies. Some companies allow 45 to 50 per cent.,

* "The Medical Examination for Life Insurance." 1901. Pages 121–130

others rarely more than 30 per cent., while one company is said to accept no one who weighs over 225 pounds."

Shepherd,* classifying a number of cases according as the weights were within normal limits or 20 per cent. or more over weight or under weight, found that of the normal weights 14·5 per cent., whilst of the underweights and overweights 21·7 per cent. and 30·2 per cent. respectively had died. In the discussion on Shepherd's paper Dr. O. H. Rogers, from other sources, was able to confirm the injurious influence of overweight on longevity. He remarks: "I think that there is only one conclusion to be drawn from the facts, and that is that any company that accepts risks on lives twenty-five per cent. or more overweight is going to have a high mortality among those lives. From observations of my own, I am able to say with the utmost confidence that high mortality will occur whether they are insured on life tables or on endowment tables, and in spite of the care shown in their selection."

2. Relation of Obesity to Age.

Excepting, perhaps, in children, it is during the middle period of life that obesity may be said to be "least abnormal." After the age of 60—65 the presence of much obesity should probably prevent acceptance of a life altogether.

3. Relation of Fatness to Sex.

The general experience seems to be that corpulency is less injurious in women than in men. It is as though the female organism, specially adapted to accommodate itself to the burdens of child-bearing and lactation, has likewise the best power of accommodating itself to the burdens of obesity. In this connection the fact that women will, on the whole, more readily than men abstain from alcohol and undergo dietetic and other treatment for obesity has likewise to be taken into account. On the other hand, in women obesity may come on very unexpectedly, possibly in relation to disturbed functions of the sexual organs and premature menopause.

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* Quoted by Greene, *loc. cit.*

Dr. J. R. Wardell* gives at some length the case of a married woman, who at 18 was thin and delicate; she had no children and lived well, and at 41 died in a condition of extreme obesity. I can myself remember two extremely delicate looking young women, both of whom I know afterwards became monstrously obese and died, one aged about 46, the other about 39; the first became diabetic, the second dropsical. Both of them were married, and the first had several children. This chance of the unexpected development of extreme obesity is hardly of sufficient importance to be taken into special consideration when recommending young women with apparently first-class lives for insurance.

4. Relation of Obesity to Family History and Race.

A fat person's chance of longevity may be accounted greater if the family history shows that his parents and some of his other relations have been equally fat, and have yet lived to a good age. On the other hand, his chance is less when there is a family history of deaths at relatively early ages from diabetes, cardiac failure (especially if unassociated with rheumatic valvular disease), emphysema and bronchitis, "asthma," "congestion of the lungs," and other diseases, which are either pathologically allied to obesity, or, at least, are favoured and rendered more dangerous by the obesity.

When there is a decided family history of tuberculosis a moderate tendency to fatness unassociated with alcoholic indulgence or other unhealthy habits is a point in the applicant's favour. Dr. A. B. Bisbee† from an examination of cases with a supposed predisposition (hereditary or acquired) to consumption in the combined experience of the Washington Life and National Life Offices found that the percentage of consumptive deaths was 5·59 when the weight was above the standard, and 42·51 when the weight was below the standard.

Corpulency is more frequent amongst certain races than others, for instance, amongst certain castes of Hindoos. I do not know how

* "London Medical Gazette." New Series. 1849. Vol. VIII., page 536.

† See C. L. Greene, "Medical Examination for Life Insurance." 1901. Page 329.

this affects their chances of longevity, but I believe my friend, Dr. T. D. Lister, who is present this evening, has received some information on the subject. Dr. C. L. Greene* says "The Tennessee mountaineer is tall, thin, and wiry, but very healthy and long lived. A Pennsylvanian Dutchman is remarkably heavy for his height, but is, nevertheless, also long lived. Such men cannot be held to the same weight limits as would apply to men of a different race and build."

5. Relation of Fatness to Past History.

Sometimes the obesity is apparently not progressive, it being shown that the applicant's weight has remained about the same for a long time, or has even slightly diminished in recent years. This circumstance is of course favourable, especially when the fatness has never been extreme. Sometimes, as already mentioned, the accumulation of fat may supervene on convalescence from an acute disease, such as typhoid fever, or follow great privations (*e.g.*, the cases said to have followed the Siege of Paris, 1871), or other causes of debility. In these cases the obesity may be merely of temporary nature and soon disappear, either with or without special methods of treatment.

6. Relation of Obesity to other Diseases.

When there is pulmonary emphysema, a tendency to bronchitis, or a history of attacks of asthma, the presence of obesity, with the extra burden which it throws on the heart, makes the life a still less satisfactory one. No life is, I think, insurable, in which any disease of the cardio-vascular system is combined with obesity. Recently I had to examine an obese, rather plethoric-looking, middle-aged man for insurance. Although there was obesity in the family, the family history in regard to longevity seemed not to be particularly bad. I could find no evidence of disease besides the large accumulation of fat and very decided pitting to pressure over the shins. Cases of this kind, that is, when obesity is associated with decided (more or less chronic) œdema of the lower extremities, as it not very rarely is, should, I think, all be rejected, even in the absence of obvious cardiac or renal disease.

* "Medical Examination for Life Insurance." 1901. Page 122.

The tendency to atheroma of arteries and death by cerebral hæmorrhage is greatest in the "plethoric" type of obese persons, in whom the excess of adipose tissue is generally associated with great muscular development and strength. These are the persons, who, to borrow a quotation recently used by Dr. Gee, "are full of coarse strength, rude exercise, butcher's meat, and sound sleep." They are probably, as a rule, no more amenable to treatment than other obese persons, nor are their lives more satisfactory for insurance purposes.

We must here mention the now well-known association of obesity with glycosuria (and diabetes). Sugar often appears in the urine of fat persons. Frerichs* found that 59 of 400 diabetic patients, that is 15 per cent., were obese, Seegen 30 per cent., Bouchard 45 per cent., Carl von Noorden 21 per cent. Kisch, from his experience at Marienbad, came to the conclusion that of persons with hereditary obesity more than half become diabetic, whilst of persons with acquired obesity (diet, etc.) about 15 per cent. become diabetic. Noorden points out that "alimentary glycosuria" can be sometimes induced by the administration of only 100 grammes of grape sugar, in the case of fat persons whose urine has not yet been found to contain sugar. He thinks that such persons have a kind of "masked diabetes," that their power of burning up sugar is limited, and that later on they may become actually diabetic. The diabetes of fat persons past middle life is not usually of the severe form, and generally disappears, at least temporarily, under suitable diet. Sometimes, however, a severer form of diabetes and diabetic coma may ensue.

7. Relation of Obesity to Food, Drink, Occupation and Habits.

We need scarcely draw attention to the importance of information on the habits of fat persons in regard to food and drink. Sir Dyce Duckworth† writes: "Occupation and habits of life are

* See "Die Zuckerkrankheit." By Carl von Noorden. Third Edition, Berlin. 1901. Page 53.

† Allbutt's "System of Medicine," Vol. IV., page 615.

familiarly known to induce obesity in certain classes of persons. Sedentary life, whether in or out of doors, favours it. Active members of any profession are not prone to become corpulent unless there be a strongly-inherited tendency. Coachmen are apt to suffer unless they groom their horses. Soldiers and sailors do not become obese until they retire from active duties. Sea-captains, owing to their good appetites and limited locomotion, are often victims in spite of their open-air life. In all these cases habits of beer drinking or of spirit drinking (even if well diluted) are certain to aggravate the tendency."

8. THE KIND OF OBESITY, AND THE POSSIBLE INFLUENCE OF APPROPRIATE DIET, ETC., IN REGARD TO LIFE INSURANCE.

Plethoric types of obesity may be distinguished from anæmic types, but there are intermediate forms.* Of more importance for insurance purposes is a classification derived from the family history of fat persons. In some families, in spite of a tendency to obesity, the average duration of life, even of the fat members of the family, is fairly good. In other families a tendency to obesity is combined with one to bronchitis and cardiac weakness, and to relatively early death from diseases of the heart, blood-vessels, and lungs.

When there is no family tendency, and the obesity results from over-eating, insufficient exercise, etc., the chances of improvement by dietetic and other means are greater. On the other hand, Sir James Paget, from the surgical point of view,† at

* A moderate tendency to plethora and fatness is often associated with great muscular development and great physical and mental energy. The "John Bull" type of Englishman is a capital example. Such persons, if they have active open-air occupations, may be long-lived. This was probably recognised by the great Francis Bacon when, in his "History of Life and Death," he wrote:—"Macies cum affectibus sedatis, tranquillis et facilibus; *pinquior autem habitus cum cholerâ, vehementiâ et pertinaciâ*, diuturnitatem vitæ significant."

† The apparent contradiction between these two views is explained in the following way. Fatness induced by alcoholic indulgence and indolence may certainly to some extent be counteracted by giving up the injurious habits in question. On the other hand, obesity, when brought on by alcohol, &c., is only a part of a morbid process, and is more likely to be associated with grave degenerative changes in the cardiovascular system than when there is no apparent cause for the corpulency, excepting perhaps a family tendency. In the prognosis of obesity, no less than of cardiac disease of middle life (see J. MITCHELL BRUCE'S "Lettsomian Lectures" 1901), the cause as well as the amount of the affection has to be considered. (Note added April, 1901.)

any rate, considered over-fat cases to be especially bad if the fatness is not hereditary, but in any degree referable to over-eating, soaking, indolence and defective excretions. The worst of the class, he thought, might be known by their bellies being pendulous and more prominent than even their thick subcutaneous fat seems to account for. This tells of thick omental fat.* Sir J. Paget's experience brings me to another point. In examining fat applicants for life insurance, height and weight and thoracic measurements should not be considered sufficient, but the maximum girth of the belly (probably at the level of the umbilicus, if taken with the applicant reclining at full length on his back) should likewise always be ascertained and compared with the chest measurement—namely, the circumference of the expanded thorax at the nipple level.

In regard to the results of dieting, etc., the question is not *How much can* obesity or the tendency to obesity be counteracted by treatment, but *How much is it likely* to be favourably influenced in the particular case; and we naturally remember how often treatment is neglected or entirely given up by corpulent persons whose condition much requires it.

A sign of the frequent intractability of obesity to treatment is the fact that a great accumulation of fat is often found on the bodies of obese persons, even when death has taken place from chronic wasting diseases, such as cancer or cirrhosis of the liver. In the reduction of obesity much depends on the energy of the patient, on his intelligence and determination. We have already alluded to the case of Dr. George Cheyne, who weighed 32 stone, but by treatment reduced himself by one third and lived to 72 years of age. Exercise, diet, &c., when they fail to remove the obesity, may still do good by maintaining the activity of the various organs. However, even if treatment is successful, the tendency is for the obesity to return when the treatment is discontinued, and the life of a man who has constantly to be following medical directions for obesity cannot be called a first-class one any more than the life of a man who passes

* Sir J. PAGET, "Clinical Lectures and Essays." 1875. Page 14.

sugar in his urine unless he adheres to certain rules of diet. An extra rating is, however, hardly required in otherwise satisfactory lives when moderate obesity which followed an acute disease, has long entirely disappeared either with or without the help of special treatment.

Is it Possible to Formulate Exact Rules for Loading Lives According to the Percentage of Overweight?

Personally I am inclined to take as grave a view of the risks of overweight as that taken by the American authors whom I have quoted; I am inclined to place rather narrow limits on the variations from the normal standard to be accepted without loading.

Cases of extreme obesity would naturally be rejected by all insurance companies, but in regard to the lesser cases, owing to the many questions previously referred to, I think no general rules for loading can be formulated. English statistics bearing on the subject are, as far as I know, almost wanting. Heights and weights hardly figure at all in hospital post-mortem entries, and the certificates of death required by law can yield no information in this direction. I hope, however, that the discussion to-night will elicit individual experiences of medical men and insurance companies.

Sir Dyce Duckworth: I think all the members of the Society will agree that the author of the paper to-night has really, in one sense, left us very little to discuss, because he has discussed almost every phase of the topic. On the other hand, he has opened out so many suggestions that he has provided matter for a good discussion. I have been thinking over the subject since I heard this paper was coming on, and I thought I would ask the Manager of the Insurance Office to which I am attached what his experience was. His experience of life assurance work is very large, but in this matter exceedingly small, and he told me that he could not remember that his Society had suffered in any degree from cases of fatness, which shows that the medical officers of his Company have done their duty well for many years back. He had nothing more than impressions, which a good many of us have, and I am one of those who believe that impressions in medicine are

very good things. At all events, he had the impression that unduly stout people were bad subjects for life assurance. From what he had seen, read, and heard, he thought that unduly stout people were bad subjects for acute disease, and that their lives were generally shorter than those of people who were of thinner build. Sir James Paget used to teach that stout people were certainly short-lived as compared with the "lean slippered pantaloon" type of man who went on to a great age. I think most of us who have known people who have lived into the 80's or 90's have found that they were lean, mummified kind of people, whose vital rhythm went on quite quietly, and who were not disturbed by undue obesity at any point. I also remember Sir William Jenner telling me a story which I think should serve all practising physicians in good stead. He was called down to the country once to see a gentleman suffering from pneumonia. It was cold winter weather, and the practitioner met him at the station with his carriage, and said "I am afraid this is a very bad case, and I do not expect this man to pull through. He is a lean, poor, miserable, thin man, and spitting up large quantities of blood." Sir William Jenner said: "You have told me two things that make me think favourably of the case, because the leaner the patient, and the more blood he spits up in pneumonia, the more likely he is to pull through." That patient recovered. I suppose none of us would be inclined to pass an unduly stout person, and yet I think we must never pay too much attention to this one symptom, but must, in reviewing the whole life and character of the patient, his physiognomy, and general habits, have regard to the obesity in connection with other matters, family history, time of the obesity coming on, the condition of the heart, the circulatory system, the urine and the manner of life. The mere fact that a person is obese, *per se*, is not enough to condemn a man. A man may be recommended as a second or third class life who really presents a great amount of adipose tissue, if we see it in its due place, and we must not reject a man on account of any particular thing as an all-round general principle. I think if we look at it in that light we shall do what is most

fair to the average applicant. I should be prepared to say that I have seen a very few unduly stout applicants for insurance. I do not think we see great big Falstaffs, and that class of people; in my experience they certainly do not often present themselves. But I confess one is immediately arrested by their bulk, and has to consider most carefully what the particular symptom may mean in each individual case. That is the case in life assurance as well as in the practice of medicine, we do not treat particular diseases, but treat people who are in those conditions, and who are suffering from those diseases. The occurrence of obesity in slender women was alluded to by Dr. Parkes Weber, and as it is a point which has been noticed, especially in families who have a gouty inheritance, it is curious to observe how some of the single daughters or sons of a family inheriting gout, will suddenly become extremely stout, grotesquely obese, while others of the family retain their comeliness. This has been called arthritic obesity. I have certainly come across instances of that kind. I think Charcot alluded to such cases. A perfectly slim, beautiful young woman of 17 or 18, at the age of 35 will be quite unsightly and extremely obese, and sometimes these people, when they have accumulated a large amount of abdominal and omental fat, begin to be glycosuric, and after the glycosuria has lasted some time they may lose their fat, and eventually become severely diabetic. The presence of diabetes in the obese has to be considered in the case of life assurance. If the urine is examined and found to contain a little sugar, such cases should be at once arrested. I think Dr. Weber is to be congratulated on having produced this paper.

Dr. DE HAVILLAND HALL: I agree with Sir Dyce Duckworth in thanking Dr. Weber for this excellent and suggestive paper, which will be of great service to us to refer to in future. In reference to the subject of obesity in regard to life assurance, I was very much struck by a remark made by Dr. Heron at one of our previous meetings. The question of obesity came up, and he said he would advise any obese applicant for insurance to apply at an office where the medical officer himself was stout. I understand from Dr. Heron

that that advice has been followed in one instance. Naturally, a man who is somewhat above the average weight looks with more kindly feelings on a fellow sufferer than a man like myself, who is very much underweight. At all events, when I joined my Assurance Office my senior was rather a portly man, and there were a good many portly men among the Directors, and I think that is one explanation of the number of over-weights I have come across in going over the mortality of the past. I was rather disappointed to find that I had only three complete years available to refer to. The years are 1897, 1898, and 1899, and in those three years we have had 297 claims, and out of those there have been 26 over weight. The scale we have adopted at my office is to take all over 15 per cent. as over weight, anything under 15 per cent. we will take as a first-class life, other things being equal. Fifteen per cent. was the margin I suggested some years ago, and my directors accepted it.

The PRESIDENT: Do you reckon that fat or muscle?

Dr. DE HAVILLAND HALL: Simply the average weight compared with the standard. It has no reference to the origin of the fat, but simply to the bare figure.

Dr. ———: Do you treat country cases in the same way?

Dr. DE HAVILLAND HALL: Yes, all alike. I do not say that we will not take them over 15 per cent. without addition, but we look upon everything under 15 per cent. as to be disregarded altogether.

Dr. PARKES WEBER: May we hear something about the under-weights?

Dr. DE HAVILLAND HALL: 15 per cent. would be almost the maximum as under weight. We are, of course, more particular with the under-weights than the over-weights. Nearly all offices agree that under-weight is much more serious than over-weight. Of these 26 over-weights who became claims in these three years, 21 were losses to the office; 15 per cent. of those claims were for over-weights, and 7 per cent. were losses to the office. That will show what an extremely important thing the question of over-weight is. It will certainly make us careful in

the future in recommending over-weights. In the last five or six years I have been diligently impressing this upon my directors. I give them a report every year of the mortality of the year, and I point out these cases, and tell them how many deaths have been over-weights, and what the losses are. On looking at the causes of death some were due to suicide, glanders, dysentery and malignant disease, and possibly accident; but here again, although we know that over-weights are bad subjects for disease, these diseases can be very little affected by the over-weight of the individual. Those claims amounted to seven. On the other hand, deaths from influenza, pneumonia, rheumatic fever, cirrhosis of the liver, and apoplexy, were probably influenced by the presence of obesity and the conditions which induced it, and those claims were 14 in number. So that out of the 21 cases in which the Company experienced a loss, 14 were from diseases in which, I should think, the obesity would play an important part in giving rise to death. As regards the margin, I have said that my Company take 15 per cent. as the limit of safety. Anything under 15 per cent. is accepted without any hesitation, but from 15 to 20 per cent. they are very much more careful. Over 20 per cent. certainly the life would be loaded, and I think they are now getting to refuse cases of more than 25 per cent. over-weight, unless there is some particular exception. Last week we had a farmer in middle life, living an out-door active life, with a good family history, and he was just a few pounds over the 25 per cent. margin. I ventured to recommend this man as a first-class life, in spite of his 25 per cent., based largely on the fact of his excellent family history, his excellent habits, and his out-door life, but I doubt whether it was a very wise thing to do. Then in estimating the proportion between height and weight one must always allow a margin for the age of the individual. The tables generally given of the relation between height and weight are drawn up for the age of 30, and I am accustomed to allow half to a pound per year for the addition which takes place in the normal tendency to increase of weight with advancing years. I think we may take it that most people do put

on weight towards middle life, therefore, what would be a normal weight for a man of 30 is certainly rather below weight for a man of 40 or 45. Dr. Parkes Weber spoke about a tall man of 6 feet 1 inch being undesirable. I go further than that. I think anyone over 6 feet is more or less an uncertain life. They are not nearly such good lives as a man about 5 feet 10 inches. I must say that I attach great importance to having the height and weight of all candidates for insurance, especially in the country. It seems to me a great source of comfort in recommending a life to have accurate measurements as to height and weight, feeling certain that, in a man against whom there is nothing more to be said, if we find there is a correspondence between his height and weight well within the 15 per cent. margin, there is much less risk in recommending this man than if the margin is exceeded in either direction. If he is much over 20 per cent., with any unfavourable feature in his family history, as deaths in middle life. it would certainly induce me to rate him up considerably, to suggest that he should come to the head office, or possibly that the life be rejected. With regard to the tendency to diabetes in these cases, I may say that three of my deaths were from diabetes, four from apoplexy, and three from cirrhosis of the liver. Curiously enough the two deaths from heart disease were both sources of gain to the Company. That was quite contrary to what I expected: I expected to have found there would be several deaths from heart disease amongst these over-weights. Apoplexy, diabetes, and cirrhosis of the liver were specially fatal. However, my figures are very much too small to base any decided argument upon, but still I thought the Society would like to have them, such as they are, as at all events they represent the actual facts observed by myself in the course of the last three years.

Dr. Symes Thompson: Mr. President, we have to thank you, Sir, for suggesting, and Dr. Weber for bringing before us this paper. As regards definite diseases, we are able to form very definite views as to their course; but with regard to these indefinite things, such as stoutness and leanness, we need the guidance and help which

such a society as this is calculated to give us. Twenty-five years ago, in my office, an analysis was made of lives that had been rated up, and the mortality arising amongst those who were too stout was so very large as to draw my attention forcibly to the matter, and I think in my office, as in that of Sir Dyce Duckworth, there has been since that time very much greater care exercised as regards over-stout people than before, and I think I may say that the mortality from this cause has not been so excessive. Yet, at the same time, I think it must be admitted that, say what we will, this class of case is an exceedingly unfavourable one. When you come to compare the stout—as Dr. Hall has done—with the lean folk, it must be admitted that they are much less satisfactory than those whose weight is less than the normal. Of course, a considerable number of those whose weight is less than normal die prematurely, especially from pulmonary affections; yet the care taken to exclude tuberculosis cases is so great, that I think those who are below the average in weight turn out favourably, on the whole. For my part, I should be very much more ready to accept a man 15 or 20 per cent. below the average without extra rating than I should if he were 15 or 20 per cent. above the average. I remember making this statement in an article I wrote on life assurance for Clifford Allbutt's Dictionary, and I have been accustomed to act upon it since that time. With regard to the connection which obesity bears to other diseases, I think this has been so fully and clearly put by Dr. Parkes Weber that I am hardly inclined either to traverse or criticise his conclusions. I think his description is exceedingly good. As Dr. Hall said, we shall find it of very great help in future. But as regards the facts: when we come to meet with these people in detail, whether we see them ourselves, or see the reports upon them, we must admit that the difference of build, the weight of the bones and the muscles, etc., have so large an influence that the mere weight as compared to height is not taken alone of very great value. It is the person with a pendulous abdomen, a great amount of omental fat, and the like, whom we have to fear, and of course if that is associated with any tendency to transient glycosuria, and if

it is associated, as I believe it often is, with a tendency to œdema, I think we must regard it as a serious thing. I believe, as Dr. Parkes Weber has said, it is not at all an unusual thing to find in stout people slight pitting over the tibia, and when we find this present, it means that there is a lack of circulation, oxidation, and of vitality, so that such a person would have great difficulty in throwing off disease. I would strongly emphasise the risk which we run in accepting those whose weight is 20 per cent. above the normal. Let me mention a case illustrating the danger of excessive weight. Five months ago I passed a man, at ordinary rates, at 33, 6 feet in height, and weighing 14 stone 7 lbs. His breadth and muscular development were great, and he was not distinctly obese, yet he became a claim within four months. He died of influenza-pneumonia, which would probably not have occurred had he been a smaller man.

Dr. Glover Lyon: I have listened with great interest to the very able paper by Dr. Parkes Weber. This is a subject which has been from time to time suggested, but Dr. Weber has been the first one who has had the pluck to tackle it. I think the chief value of his paper is the extreme thoroughness of it. He has gone through every point that could possibly come into the question. That was the trouble in obesity. We all thought of certain cases of our own experience, and we heard of other cases of men with larger experience, but we were not able to go through the subject so thoroughly as we have been able to do to-night. One point, I think, Dr. Weber mentioned, though perhaps he did not quite make enough about it, was the subject of race. I think in point of race there is one very large race which should be dealt with, specially in obesity, that is, the Hebrew race. I am inclined to think obesity in the Jew does not mean what it does in the Gentile. They are more given, as a race, to obesity without feeling the effects of it, and you may also say as a general rule that Jews do not drink to excess, so that one very great danger in obesity is avoided in a Hebrew. Dr. Weber took a very lenient view of obesity in women. It is a mere opinion, but I am inclined not to agree with him. I should be

inclined to make no difference between a fat man and a fat woman. As to dropsy and pitting, the remarks I have heard were those I really wanted to hear, and I should like to hear some more on the subject. As a rule if I get any œdema of the leg in anybody, I refuse the life. I have often thought when I have a fat man before me with slight œdema, whether I was justified in doing so, and I should like very much to hear the opinion of experienced members of the Association on that matter. I, of course, have known fat men go on to quite old age, that is, considerably over 60, but at the same time I do think that until we know more about it we should refuse everyone who has œdema of the legs. Really the paper is so good that there are only a few minor points to discuss. With regard to the experience of a man in Marienbad as to obesity, I think it is utterly worthless, because his experience is so special.

Dr. Parkes Weber: It was only the experience on a special point, just one of the points a man in Marienbad could go into. It was a urine point.

Dr. Lyon: I thought you said he gave his experience as to the percentage of fat people who got sugar in the urine. I think that experience is quite unsound, because he would not have a general experience of fat people. Dr. de Havilland Hall mentioned the limit of percentage. If there is any truth in what Dr. Parkes Weber said as to a short fat man being a better life than a big fat man, I think we should give a larger margin to the short man in point of overweight than we should to the tall man. Is there really any reason to put a man up for obesity alone? Can any of us remember having a man come before us, say with 25 per cent. extra fat, any man weighing 15 st., without seeing something we did not like besides the mere obesity? I cannot imagine a man coming weighing 15 st. without seeing something else which made us distrustful of him. I have never seen such a man rejected for obesity alone, there must be other points about him which would make me inclined to refuse his life. That is a good deal confirmed by the remarks of Dr. Symes Thompson.

He showed us what very great extra mortality and loss there have been in stout people who had been put up, that is, they were not considered healthy lives. All Dr. Symes Thompson's experience—an extremely valuable one—comes to is, that amongst the extremely fat people that the examiner did not like a large number died. That would be, I think, the experience of all of us, but I do think clinical acumen should enable a man to refuse a life or accept him largely apart from mere obesity. I had the honour of reading a paper as to re-considering lives, and this is one of the very subjects that came into that category. Dr. Parkes Weber spoke of the past history as being valuable. In the same way I maintain that the future history would be. Suppose a man of 30, 20 per cent. or anything above the average, it would be reasonable to put that man up a certain number of years, and if his weight had not increased when he had got to 40 that extra might be taken off. It seems to me a particularly good chance of giving a man an opportunity of re-examination after a few years.

Dr. LUBBOCK: Perhaps I may also be allowed to add my thanks to Dr. Parkes Weber for his interesting paper. He has said almost all that can be said about this subject, but having made an analysis of 200 early death claims which I mentioned at the last meeting, I thought that it would be interesting to see how many of these were suffering from overweight. I found that there were 18 in which the weight exceeded the maximum weight which should exist at the same age and height.

The PRESIDENT: Just exceeded?

Dr. LUBBOCK: By a good deal in many cases, exceeding the average weight for the same age and height by 40 per cent. in one case, 30 per cent. in six cases, 25 per cent. in five, and more than 20 per cent. in the rest. The height of the applicants was usually great, being 6 feet or more in five cases, 5 feet 10 inches in four, and 5 feet 9 inches in two cases, this seeming to show that there was often something in the height of the patients which made them less acceptable applicants. In some, on account of their profession or habits, there seems to have been a tendency to generous living.

There were two brewers, one wine merchant, and two had gout, which probably meant that they were living somewhat freely, while two others are said to have lived generously. With respect to the cause of death in the different cases, nine of the 18 cases died from some vascular affection, six dying from heart disease, with fatty degeneration of the organ in three cases, one from aortic aneurism, one from cerebral hæmorrhage, and one from general arterio sclerosis and cerebral embollism. As has been already mentioned, the tendency to death from pneumonia seems to be somewhat great, three of these cases having died of that disease which in two of them was combined with bronchitis. In one case death was due to Bright's disease, in another to diabetes mellitus, and in the other cases death was due to suicide, typhlitis with abscess, hepatitis with intestinal obstruction and colotomy, and senile dementia with exhaustion. That 18 of 200 early death cases should have suffered from obesity does not seem a surprising fact considering the number of such applicants who present themselves for insurance. Upon looking through the last 900 cases which I have had to see, I found that from 6 to 9 per cent. of the accepted applicants suffered from this condition, so that the death of 18 in 200 does not seem as if obesity was a very potent cause of death.

Dr. DE HAVILLAND HALL: To get a percentage of overweights I should like Dr. Lubbock to tell us the losses of those 18. Could you say how many of these 18 were losses to the Company?

Dr. LUBBOCK: They must all, I fear, have been losses, 10 having been accepted at the ordinary rate, 4 with an extra of five years, 1 with the extra for gout, and the others as endowment policies payable in 15, 16 or 18 years. Death occurred in each case within from 1 to 10 years from the date at which the insurance was effected.

Dr. CARRUTHERS: If I may trespass at so late a period of the evening, there are two points I should like to refer to. Dr. Parkes Weber referred several times to an extremely important matter, the relation of the abdomen to the chest. I have been waiting for someone to put that into practical form and say what the relation of the

abdomen to the chest should be. At my own office we have no definite rule, but we have a tacit understanding, Dr. Colcott Fox and myself, that we do not consider a man as actually obese unless the abdominal measurement at the umbilicus is more than the expanded chest. I consider that liberal, but it is the only rule we have, and I give it for what it is worth. I have been astonished to hear the very strict limits that some of the English companies draw. I have always thought my company, one of the American companies, extremely liberal in this matter, and I fancy many of the members here will be horrified to hear that our overweight limit is 45 per cent. Until a man is 45 per cent. overweight there is nothing in the rules drawn up by the medical directors in New York to hinder our accepting him as an ordinary life. Dr. Fox and myself considered that a man 30 per cent. overweight ought to be looked closely into, but I do not think we have ventured to say much about cases under that. We have a form of questions covering very much the points that Dr. Weber mentioned, which, I understand, we obtained through the courtesy of the Edinburgh Life Office; and in every case that is more than 30 per cent. overweight or that has an abdominal girth equal to or greater than the expanded chest, we ask for answers to these additional questions. In matters of race our experience has been that Welshmen have a tendency to "run to belly," that the abdominal measurement is more in proportion to their weight than that of other parts of the country.

Dr. Lister: I was unfortunately not present at the opening remarks of Dr. Parkes Weber and I do not know whether he gave a definition of overweight. I have always thought there was a need of such a definition and so far we find that the tendency of the majority is to regard 20 per cent. overweight as a condition of obesity. The question of abdominal and chest measurements is one that should be taken into account also, but in that age comes into play, and an enlarged abdomen under the age of 40 I should take to be a much more serious condition than when it occurred over the age of 40. Something has been said about the personal equation in restoring the balance in some of these cases of obesity,

and several speakers have referred to the fact that in nearly all these questions of overweight there is something else which leads one to consider that the life cannot be assured on any average terms. Dr. Parkes Weber asked me if I could give him any information about Indian lives. Our office has a branch in India and about one life that was rejected at the London office a letter was written from the Indian medical officer suggesting that the lives of natives of India exhibiting obesity with glycosuria should be considered on entirely different lines to the lives of Englishmen in the same case, on account of the absence of alcohol, the vegetarian diet, and the fact that nearly all those cases can be regarded as so-called dietetic glycosuria. He said we must consider those due to the excessive carbo-hydrates, and those due to the same associated with excessive fat. But the fact of obesity existing seems to me to suggest that it is impossible to regard an obese person in any condition of diet as being more insurable than any other person. When we have to form our judgment by examination we must form our judgment on the condition of obesity and associated conditions. In very few cases has it been my own limited experience to see those other conditions absent. If I may borrow a phrase of Sir Dyce Duckworth, as a junior examiner I have to go largely by impressions, but so far as my experience goes it has led me to regard the fact of obesity as being associated with other lesions. Dr. Carruthers has referred to the rough rule of comparing the measurement of girth with that of the expanded chest. It is one I have acted upon for some time and, although it is very rough and ready, I think it has some value.

Dr. Davies: Dr. Glover Lyon in referring to the question of race said that the Hebrew race were not given to alcohol, that they were subject to obesity and that we ought to regard them as a different class of life from other races. But, I believe as a matter of fact, it is recognised that Jews are very liable to diabetes. Amongst the Jews I have seen during the years I have been in practice, I have been very much struck by the number of diabetics amongst them. This brings us to the statement of Dr. Parkes

Weber, that these are difficult cases to deal with. I have long tried to ascertain the reason of this liability to diabetes, but there seems to be no satisfactory explanation. I believe the Jews are gross feeders, and it may be possibly due to this or even to their extreme mental activity. On the other hand I believe the Jews are not liable to consumption. With regard to the question of diet, I do not think we can expect our obese applicants to go under treatment. They come to us to insure their lives and we cannot rely on their going to their doctor to get rid of their obesity.

Dr. PARKES WEBER, in reply, said: I must first thank all those gentlemen who have so kindly contributed to the discussion to-night —especially Sir Dyce Duckworth, one of whose pupils I have the honour of being. I had an excuse ready in case my paper was not well received—viz., that whilst I was writing it, my own weight fell so decidedly, as to be less than it was nineteen or twenty years ago.

Our President remarks on the typical "fat boy": I think that the "fat girl" has likewise a just claim to recognition. I hardly alluded to fat children, as they do not ordinarily come to have their lives insured; but, early in the seventeenth century, Francis Bacon, in his "History of Life and Death," wrote that fatness in youth pointed to a short span of life.*

Dr. Arthur Davies and Dr. Glover Lyon referred to the very interesting subject of the relative frequency and significance of obesity amongst Jews. The relative frequency of diabetes amongst them is generally admitted. I take, however, the same view that Dr. Glover Lyon does—namely, that obesity is not, on the whole, of such bad prognosis amongst Jews as it is amongst others, and would explain this as due to the fact that they mostly avoid excessive indulgence in alcohol, tobacco, &c.

Women, likewise, mostly avoid such excesses, and this is probably one of the reasons why obesity is less harmful to them

* His words are: "Obesitas in juventute breviorem vitam præmonstrat; in senectute res est magis indifferens." (*Longævitas et Brevitas Vitæ in Homine*, Section 39.)

than to men. Sir Hugh Beevor, however, before he left us this evening, wrote a note for me, saying that fatness was probably more normal in women than in men, and therefore, he supposed, of better prognosis. Measurements show that. In women the thigh, particularly, is normally thicker in relation to height than the thigh in men. To illustrate the relative freedom of women from certain injurious habits, I may mention the fact that in the various morbid conditions more or less resulting in the children from alcoholism or syphilis in the parents, the bad inheritance generally comes from the father.

Dr. S. W. Carruthers mentioned the importance of taking the girth of the abdomen as well as that of the chest. I should prefer taking the maximum girth of the abdomen to the measurement at the umbilical level, especially when the abdomen is somewhat pendulous, and the measuring tape has to be adjusted whilst the standing position is maintained.

What Dr. de Havilland Hall said with regard to the fat man choosing the stout physician is very amusing, and I suppose, when I want to insure my own life, I ought to look out for a lean examiner.

AGE		EXPECTATION OF LIFE	DEATH RATE PER 1000
30	H. M. A.	34	4.8
40		27	8.5
50		20	14.4
60		14	28.1
30		36	6.1
40		29	8.5
50		21	12.8
60		14	24.1
30		32	7.7
40		25	12.4
50		19	19.3
60		13	34.7
30		29	8.7
40		22	15.6
50		16	25.5
60		10	46.3

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this class. The healthy male table of actuaries is put alongside to

ALL CAUSES		CANCER	DIGESTIVE			
4.8	25 — 35	.11	.3	.4		1.
8.5	35 — 45	.29	.8	.9		1.
14.4	45 — 55	1.03	1.5	2.2		1
28.1	55 — 65	2.42	2.2	5.9		1

EXTRACTS

OF

LIFE TABLES AND MORTALITY RETURNS

FROM REPORTS OF

THE REGISTRAR-GENERAL AND DR. TATHAM.

(Read before the Life Assurance Medical Officers' Association, June 5th, 1901, *by Sir Hugh Beevor, Bart., M.D., F.R.C.P., Medical Officer Norwich Union Insurance Society.)*

Some tables illustrated by diagram are brought before this Society as elementary matter bearing upon Life Assurance.

These figures can hardly be used as information to assist us in forming a prognosis upon the expectation of life of proposers; that is an art and so it will remain.

They are intended to further the scientific foundation of our art, and as matter for reference the tables and diagrams, it is hoped, may be of future service.

Many branches of medical work call for attention to death rates; less often are the medical men called upon to consider the so-called expectation of life. So four instances have been here taken of male population during the working period of life, 25 to 65, and the figures for expectation of life and for mortality are set side by side to show generally the relation they bear to one another. A contrast rather than a comparison.

The first instance, the Professions, refer to a class which formed in the past a large proportion of insurers—clerical, medical, legal and schoolmaster men. There is unfortunately no life table of this class. The healthy male table of actuaries is put alongside to

form a substitute, and, if we compare them with the next table, it seems not far from the mark.

The second is taken from the Healthy District Table of England, 1881-90. This might not unfairly be called a Rural District Table, for three-fourths of its constituent areas are rural districts, and it consists largely of agricultural labourers.

Here comparing life expectation with H. M. A., we see it is a trifle longer; comparing mortality with that of professions, in the last two decades it is lower, in the first higher. The higher rate in the first decade raises the question how perfectly inclusive occupation statistics are. Is the low death rate of professions in the first decennium due to survival of the fittest, or rather a non-return of those invalided out of the ranks? The Registrar-General has pointed out that many of the insane and of the phthisical are now returned under the heading "unoccupied," having left their occupation a considerable time; so we must bear in mind that this record of the mortality of professions is to some extent unduly favourable.

The third and fourth tables, like the Healthy District, express expectation of life and mortality of the same population. They show those of us who are uninitiated, that the ciphers telling of a high death rate are much more alarming than the ciphers for the corresponding expectation of life; thus the Lancashire artizan at age of 50 has an expectation less than the countryman 16 to 21, but his mortality in the two last decennia is about double. The data of later life were considered in forming these tables. Though the figures are limited to these ages we may fairly presume that the after life proceeds in a healthy or an unhealthy district either favourably or unfavourably, but still in accordance with its course during the years of occupation here referred to.

England has its population composed of unequal parts; the larger urban, and more or less resembling the experience Dr. Tatham drew out for the outlying townships of Manchester; the smaller part

rural, and composed of these healthy districts and others of an experience a little less favourable. There are also some districts, such as that of the Manchester township itself, which have a mortality double that of the outlying townships. The England of 1881-90 has very little changed its expectation at these times of life from that at the two previous decades.

It has seemed worth while to extend this enquiry, and to note the causes of death that affect these populations. Nearly all causes of death are included under seven main heads as arranged by the Registrar-General. These headings represent real differences in mode of decay. The several populations will be seen to suffer not only absolutely, but relatively in a different way under different headings.

The second diagram attempts to afford a rapid ocular demonstration and means of comparison of the seven main groups of mortality in each population.

In Professions, and in England, this detail of mortality can be directly extracted; in healthy districts and the Manchester outlying townships it cannot. So in the former I have taken a part for the whole; all the rural portion of the rural County of Norfolk is included in the healthy districts, and the mortality, as you see, of this County almost coincides with that of the healthy districts; the ages taken represent 83,000 deaths. In the latter I have taken Lancashire (850,000 deaths), or a whole for the part. Here again the All Causes mortality coincides with that of the outlying townships, and this County is predominantly urban.

This diagram may be of service for reference and future comparisons; it is to be regretted that its complexity burkes discussion, the proper function of this Society.

As an instance of reference, in your Transactions May 1898, Dr. Hingston Fox quotes the H. M. A. mortality 1869 as about 7, 10.1, 15.5, 29.4, in comparison with these tables.

Some bare and brief comments upon the most salient facts may be made, though they be commonplaces.

The difference under each grouping, comparing one district with another, whether little or much, is fairly constant in all decennia ; a small or a great difference tends to run throughout—from the least seen in cancer, to the greatest seen under the group of respiratory system disease ; an increase great in one is great in all.

Cancer stands eminently with least difference ;

Nervous and circulatory diseases seem to come next ;

Digestive deaths next ;

Renal deaths follow ;

Phthisis and respiratory system differ most from one district to another.

Of cancer—one notes it is the only disease that stands highest in the professions ; it does not bulk large, however, and in the face of popular interest and frequent discussion, the amount demands we do not over-estimate the importance. It is of date 1890-92, not quite cotemporaneous with all the other rates.

Nervous and circulatory deaths appear to be really associated, so generally coincident is any rise or fall. The physiological dependence of the heart upon the nervous system is so intimate, and *vice versâ*, that such an association seems a natural one. There is seen a rise in both of these diseases among the brain workers, though with them less than in Lancashire, absolutely, it is greater relatively to all causes of death. It is remarkable that professions should suffer in circulatory disease as well as in nervous, relatively far more than the healthy country labourer of Norfolk. Nervous disease causes death by mania and epilepsy in the first decennia, by apoplexy in the last. Diabetes is not included in any of these groups. History and examination of proposers more than occupation and habits, afford opportunity of forecast of a curtailed expectation of life under these causes.

Habits and dietetics, on the other hand, are the predominant consideration in foreseeing injury that induces the deaths from renal and digestive organs; this accounts for the increasing change of incidence in the several populations under these two groups.

Deaths of the Digestive group refer mainly to disease of the liver and stomach.

Deaths of the Renal group are practically all due to Bright's disease in its different forms. These rates may be of greater import than the figures state, being an index of such derangement of liver and kidney as eventuates in a death entered under the heading of nervous or circulatory disease. The high rate of renal disease in the professions is noteworthy.

Phthisis is the antithesis of cancer in age incidence; it has justly and accordingly been carefully considered by every Life Office. Its great variation gives reasonable hope of protection of the office by the selection of cases.

In respiratory system disease we meet with the extreme of fluctuation, where Lancashire becomes, from 45 to 65, a three or fourfold greater sufferer than professions and Norfolk. Pneumonia deserves separate consideration, and if we may judge the two counties, urban and rural, from the returns of occupied males in industrial and agricultural districts respectively, we find in the first two decennia pneumonia causes two deaths out of three in either county; in the third decennium an equal half; in the fourth but one part in three. So in age incidence pneumonia, with its diplococcus, stands midway between phthisis and system diseases. Pneumonia accounts more than any other single cause for the rise of death rate in districts such as Lancashire; next bronchitis, its complement filling up the latter decennia, and after these some way comes phthisis.

Occupation and air supply certainly claim our attentive consideration in conjunction with the examination of the lung. Leaving assurance aside, is not atmospheric hygiene nowadays the most

important factor in the health of the nation. Of the riddles that lie hid in the data before you, I trust the members of this Society may find a solution here and there, and I crave their assistance in any correction or elucidation.

DR. HINGSTON FOX: This interesting paper offers a field for much remark. But it is a difficult thing to deal with facts such as these without falling, right or left, into fallacies and false inferences. The first thing which strikes one is that the comparison between the various districts which Sir Hugh Beevor has put before us is one which cannot be made without taking carefully into account other circumstances connected with the districts. No doubt he has selected the age conditions, and only taken, as I understand, occupied males, at certain ages.

SIR HUGH BEEVOR: Yes, all males.

DR. HINGSTON FOX: So that the age-incidence fallacy, which is one so very ready to trip us up in comparisons of different districts, has been avoided. Then we come to the question whether the populations of these districts are increasing, or stationary, or decreasing, a question which has its influence on the character of the population; and notably whether the population is in a condition of stability as regards movement. Whether, for example, the district be a country one, in which there is a general exodus into the towns, and consequently the younger and more vigorous

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NOTE.—A. The diagram of mortality from all causes delineates the mortality by scale of length simply.

B. The diagram of mortality from several causes is drawn to a scale of surface measure.

The unit taken is one-fifth of the square inch.

For ocular convenience the height of the areas in the four decades from the first, 25-35, to the last, 55-65, has in all cases been drawn $\frac{1}{8}$ in., $\frac{1}{4}$ in., $\frac{1}{2}$ in., and 1 in. respectively.

If, therefore, the mortality, 25-35, equals the mortality, 55-65, the $\frac{1}{8}$ in. strip will require to be eight times the length of the 1 in. strip representing the older age, as shown in the diagram for Lancashire under "Phthisis."

When, however, the mortality in the older decade is slightly over eight times that of the younger decade, the diagram for Lancashire under "Digestive" shows the narrow strip at 25 to 35 to be slightly shorter than the broad strip, 55-65.

men are passing out of the population, and you have to deal with a residue containing many less vigorous people. On the other hand, the population may be one mainly of towns, where you have not merely the product of the past generation of the district, but you are consequently receiving some of the stronger elements from other districts around. Those are circumstances which have to be taken into account in comparing one district with another.

SIR HUGH BEEVOR: These all come from two censuses; the Registrar-General's figures taken from the populations in 1881, and again in 1891. Therefore it is the ordinary corrected mortality.

Dr. HINGSTON FOX: The comparison would however be invalidated if the populations vary in their character as to stability. With regard to the "expectation of life" or mean duration of life, I do not know whether this is given in the Registrar-General's returns for these districts?

SIR HUGH BEEVOR: Yes, for the healthy districts in England.

Dr. HINGSTON FOX: You compare the "expectation of life" at different ages with the mortality at different ages, which is rather a daring feat.

SIR HUGH BEEVOR: No, they are contrasted; or, if you like, they are put on the same sheet of paper.

Dr. HINGSTON FOX: Sir Hugh shows that the Manchester Outlying Townships' rate of expectation of life for the age of 50 is one-fourth less than that for the healthy districts at the same age—16 to 21. When we find that, on the other hand, the mortality at that epoch is double, I think that we are dealing with two such different things, that it is hardly possible to make an effective comparison or contrast.

SIR HUGH BEEVOR: That is just what I wish to point out.

Dr. HINGSTON FOX: Then Sir Hugh has quoted from a paper of mine some figures for the mortality of assured lives, recorded by the Institute of Actuaries in 1869. It is disquieting at first sight to

see that these mortality rates are so high. They are higher than those for the professions, especially in the early decade—higher considerably than the healthy districts' rate, and do not fall far short, except in the later decades, of the rates for the whole of England. Is it so that all our care in selection does not reduce the mortality of assured lives very greatly below that of the whole population of England?

SIR HUGH BEEVOR: But there is a generation difference in the time.

Dr. HINGSTON FOX: Yes, that is a ray of comfort, for which I thank Sir Hugh. But I think it also brings to mind that whilst our selection of lives is constantly going on, and we are using fresh material to obtain improved results, yet we are all the while working against another selection which is not in favour of the offices, a tendency for weakly men and women to get insured, and consequently the net result may not be so very much better than that of the healthy population, as one would hope for. And then, too, as regards the professions, we must bear in mind what has been already said as to the weak ones falling out, and being included when death occurs in other classes. Moreover—and this I would submit as a possible explanation of the singularly low death rate from 25 to 35—professional men are a selected class more so than in other occupations, and the influence of this selection will be most shown in the mortality of the earlier decade. Selected classes tend, as we know, to approximate to the general average of the community as time advances.

Coming to the second table—that of causes of death—I do not know where the author obtained his method of superficies as a diagrammatic representation of mortality rates, and more especially his arbitrary inclusion of superficies between certain parallels. The first decade is a narrow one, and the next superficies is twice as wide. The next decade is four times as wide, and the next eight times as wide. I venture to doubt whether that is a satisfactory

way of representing mortalities. As far as I am aware, it is a novel one. If one clearly understands that these divisions are quite arbitrary, they may not mislead us.

I congratulate the writer on the results which he has obtained from his own county of Norfolk, showing a much more favourable mortality for almost all causes. I think I understood that these divisions cover nearly all causes of death. I should like to ask him where specific fevers come in.

Sir HUGH BEEVOR: There are not many of those after the age of 25, they are not shown separately.

Dr. HINGSTON FOX: These are notable sources of mortality in assured lives, because they fall early, also accidents and suicides, but they do not seem to be represented here. With regard to cancer, although Sir Hugh says it does not bulk large, yet, from an insurance point of view, it is of great importance, because it is almost impossible for us to foresee the liability to this group of diseases. With regard to the table generally, I cannot think that for our purpose the arrangement of causes of death is a satisfactory one. The Registrar General's tables are arranged in this way, and we have to take them as they are. But from an insurance standpoint we try to go behind the immediate stated cause of death to see the primary or efficient cause, one often more of a systemic character than confined to an organ. Therefore to group the causes of death as the Registrar General does, under the various organs affected, although it may be the only way open to him, does not give for our purpose a view of the true causes. Thus, how familiar to us as one of the chief sources of loss is the great class of vascular and renal disease, promoted so often by intemperance, or by arduous modes of life. This class is distributed over the Registrar General's headings, accounting for much of the circulatory group, nearly all the renal, a large fraction of the nervous diseases (especially apoplexy), and, in practice, no small part of the respiratory, since so many persons with arterio-sclerosis, or alcoholism, die of bronchitis or pneumonia. Hence the comparison of the groups of

causes shown in the diagram is not of much value. Indeed, the striking similarity which Sir Hugh observed between the circulatory and nervous diseases may be explained by the close alliance between the primary disease processes at the back of the apparent organic disorder. Then as to the variations in the mortality from respiratory diseases, I would point out that these variations follow in the main the corresponding variation in the incidence of phthisis. Probably, after all, not a small proportion of the diseases in the respiratory class are really tuberculous, and so the disproportion which is observed—the large excess of such diseases in Lancashire, and the small prevalence in Norfolk and in the professions—may be in good part due to the tuberculous element.

It would be interesting to know the cause of one or two exceptional features in this table, more especially the larger proportion of deaths from nervous diseases in the earlier decades in Norfolk, and whether that is due, as I think it is, to mania and epilepsy, seeing that in the later decades the smaller proportion holds good.

These remarks must not be taken as indicating any lack of appreciation of the paper which has been put before us, or of the diagrams. We are greatly indebted to Sir Hugh Beevor for them. But the figures and tables are of such a character, and cover such a wide field, that they open a door for a variety of remark and suggestion.

Dr. Glover Lyon: Dr. Hingston Fox remarks upon the difference between expectation of life and rate of mortality. The difference is easily explained by the fact that expectation of life, say at 50 years of age, depends on the life up to 89; whereas the rate of mortality at 50 relates only to the age of 50. So we may expect to find a great difference between the two. Sir Hugh Beevor, in showing this great difference, has brought before us a very instructive contrast. Again, seeing that an attempt is made to swarm into our offices every cripple and invalid in the country I think the fact that we still maintain a mortality considerably below that of the general population is a result upon which we may congratulate ourselves.

With respect to the method of diagrammatic representation, adopted by Sir Hugh Beevor, I consider he has made a very advanced step in the construction of diagrams to illustrate the statistics of life assurance. We have had before us on a previous occasion the American method, which was explained by a very able member, Dr. Carruthers, and in that system we had the figures fitting into one another, the object being, I suppose, to show that the totals were right. I think that is very misleading and puzzling. Taking the cancer diagram, what Sir Hugh Beevor has done is to squeeze up the top area representing the mortality into one-eighth of the true breadth. The area still represents the mortality, but having squeezed up the height, the abscissa is eight times as great, and it shows something to the eye—something which can be grasped. I came to the conclusion that a diagram could be drawn in no other way to give such a good result.

We have heard lately much about the statistics of cancer. Some people try to make out that cancer is increasing; others say that it is not. The latter say that the apparent increase is due to our present day better diagnosis. But Sir Hugh's statistics are quite free from any such fallacy. They refer to the same periods, and therefore any improvements in diagnosis, and so on, would not have the slightest effect on the results.

The most instructive detail is, I think, the very large mortality in the Lancashire districts from respiratory diseases. I do not see why that should be. I wish Sir Hugh Beevor would give the results of his thought on that matter.

Dr. Penrose: I hope Sir Hugh Beevor will explain with regard to the last table whether he means that it is an exaggerated table. I understood he meant a definite superficies, representing particular numbers. I gather from Dr. Glover Lyon that it is an exaggeration such as is made in works on Physical Geography in which some of the levels and lines are purposely not correct to scale, as, for instance, those representing the bed of the Atlantic. I did not gather that that was Sir Hugh Beevor's idea at all.

very much in different places? These figures from the Registrar General's Returns give us a basis and the main facts as to the causes of death. I had intended not to bring this before the Society until I had the leisure to see what life assurance work might be compared with it. I have not yet had an opportunity of doing that. It took me a very long time to worry out these things, and it would have delayed the paper beyond the Session altogether if I had waited to compare my figures with life assurance experiences. Dr. Hingston Fox has kindly given me one or two references to the work which he has done, and has shown me that there is possibly some comparison which I have not yet had an opportunity of making. But as to the comparison which Dr. Ward demanded of the experiences of life assurance offices to compare with this diagram of the causes of mortality, whether that can be got at or not I cannot say; but I should think not. I have not seen anything in life assurance tables at present which will allow of that comparison. That is why I drew my tables out from the Registrar General's Returns.

With regard to Dr. Hingston Fox's first question about cancer, I have no doubt that the later date has an effect, but I think it is only a slight one, but such minutiæ I have not gone into. Dr. Fox calls my attention, no doubt rightly, to the question, in dealing with these expectations of life and death rate, of what relation they bear to moving populations. Of course our populations are always moving and altering. In these healthy district tables the figures are simply the mean of the two census returns as to population at different ages, and the estimate of the population is made from the mean of the one census and of the succeeding one. With regard to the selection against offices, is there a natural tendency that there should be such a selection against the offices by proposers who seek to insure their lives? Probably that is so to some extent, but it strikes me that there are also many people who are afraid of going to an office, and we know that those lives are frequently the finest who are nervous about themselves

This table of causes of death, as Dr. Fox points out, does not cover all the deaths, but any one can add up the figures and see how far they fall short. I am aware that the total deaths fall short considerably. As a matter of convenience, I saw no advantage in carrying details any further, because if I had done so the headings would have been more and more numerous. There is no such advantage in depicting a heading for all the specific fevers as a cause of death in the population compared to the headings of these definite regional diseases. In dealing with the causes of death the great difficulty is to get the definite cause. I think the most definite is phthisis, and the next most definite is renal. I think Dr. Fox and I, when it came to drawing out special groups would differ absolutely and entirely as to the groupings into which we put our diseases, though I agree with him in the matter of circulatory and nervous disease and should be inclined to put them almost into one group: but if so, the facts should be capable of sub-division in the groups so that the man who might differ in his view on classification should be able to take out the figures of any one name. It is a great advantage to follow respiratory diseases and be able to take out separately the figures representing pneumonia, bronchitis, &c.

As to the reliability of returns, I think in these large populations the returns represent the medical knowledge of the country at that date. I do not think we need discuss the reliability of returns. Reliability probably is not perfect, the error, if error there be, is as comparable to one part of the country as to another. I would protest that Dr. Fox has no right to suggest from the figures themselves that tuberculosis is not sufficiently represented as a cause of death in Lancashire, and that some which should go under the head of phthisis have gone under respiratory disease. That may possibly be the case, but if so it would be the same also in Norfolk.

Dr. Hingston Fox: My point was that a number of respiratory diseases in all the districts are probably really tubercular, and that the fact that many of them are tubercular would partly account for the variation in the mortality from respiratory diseases in the different districts.

Sir HUGH BEEVOR: So far as the diagrams go it is very interesting to see how closely the proportion holds. Comparing Lancashire with Norfolk, the former has a higher rate for consumption in the first decade. When you get to the last decade Lancashire is still at 32, and Norfolk has gone down to 20. This, it seems to me, tends to show that the increasing amount of consumption in Lancashire as age proceeds is well recognised, and that besides respiratory diseases there is a very great increase of consumption.

There is a further point about which Dr. Fox asks me for an explanation, but which I am unable to give. That is the great amount of nerve disease of Norfolk. This question, I believe, has exercised students of vital statistics in Norfolk and similar places before now. I believe it is partly accounted for by a great deal of lunacy in that county. I took Norfolk as a healthy district, because it was the county with the largest amount of rural district affording fair comparison with the healthy district tables.

Before handing this diagram in to be printed I shall be pleased to write an explanation of it. It is simply the superficies of the figures arranged in such a form, that instead of being put all in a band of the same breadth, the bands are of such different breadths as to enable one the more readily to compare the differences in mortality. I think that answers Dr. Hector Mackenzie's question.

I am very much obliged for the reception which this paper has been accorded, and if there are any elucidations which I can make I shall be glad to do so. I hope we may find some insurance work which will lend itself to comparison—such as that which Dr. Fox gave us when he was reading a paper on female lives.

The CHAIRMAN: You will agree with me, gentlemen, that Sir Hugh Beevor's paper, and his remarks upon it, have fully justified the course which the Secretaries and I took in asking him to read one. All we can say is, that we are so thoroughly satisfied with our course of action, because of its success, that we propose, on a future occasion, to ask him to read another paper.

Diagram I.—Part 1.

A Diagram showing the increasing margin of mortality allowed by the method of making an addition to the age. Founded on 400,057 deaths of occupied males (Dr. Tatham's Report). The space between the base line and the angular line of this part (part 1) is to be cut out, and part 2 of Diagram I. is to be placed underneath, so that the base line of part 2 corresponds with the base line of this part, and the ages also correspond. By moving the underpart to the right, as, for instance, proposer's real age 40 to office age 50, scales will come into view showing the margin of extra mortality allowed by ten years' addition, in the given instance about 8 per 1,000 at age 40, 16 at age 50, and about 65 per 1,000 should proposer live to 60. In other words, an addition to the age presumes an extra risk, which, at first small, increases greatly during the later years of life.

Thos. D. Lister, inv. et del., November, 1901.

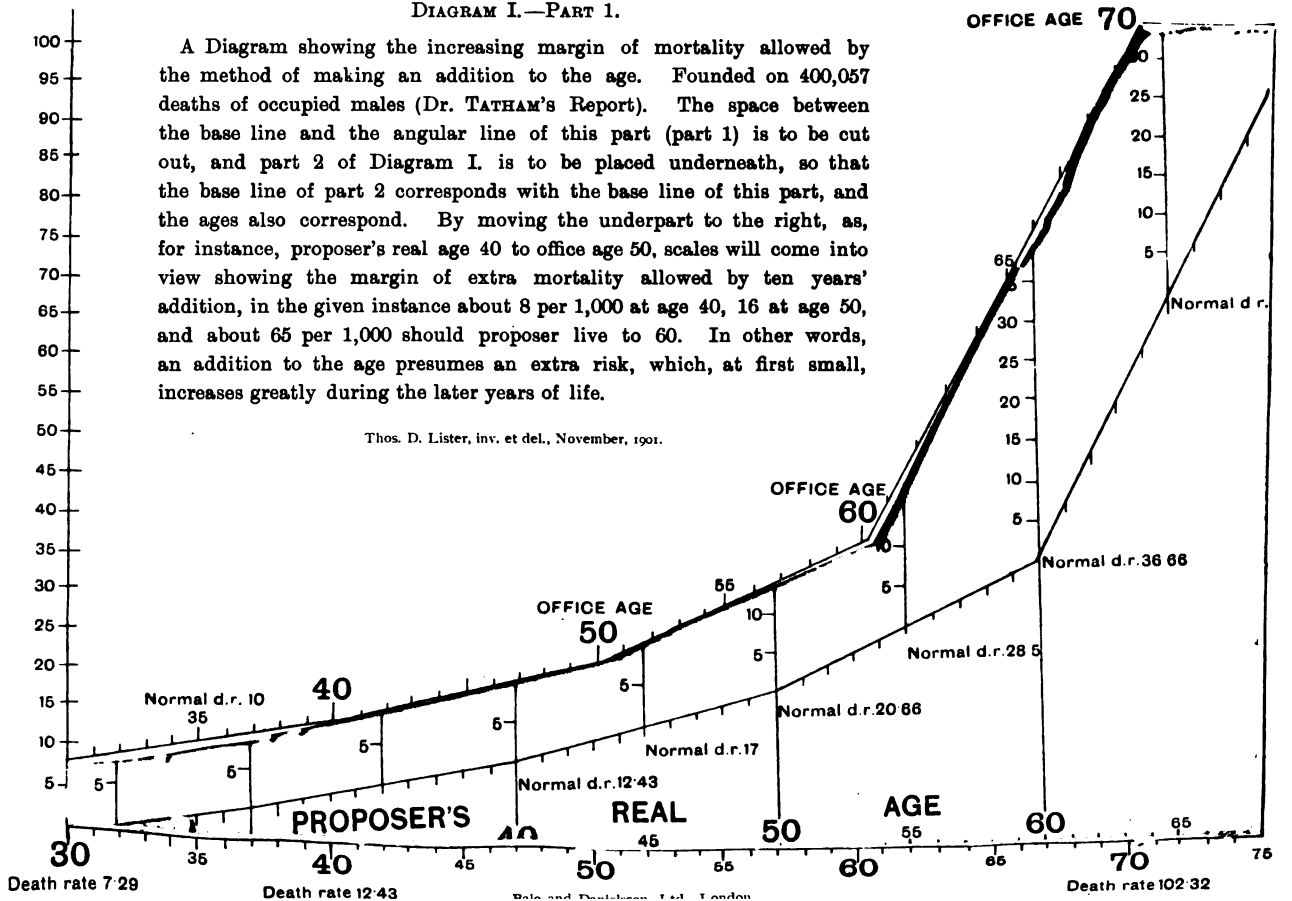
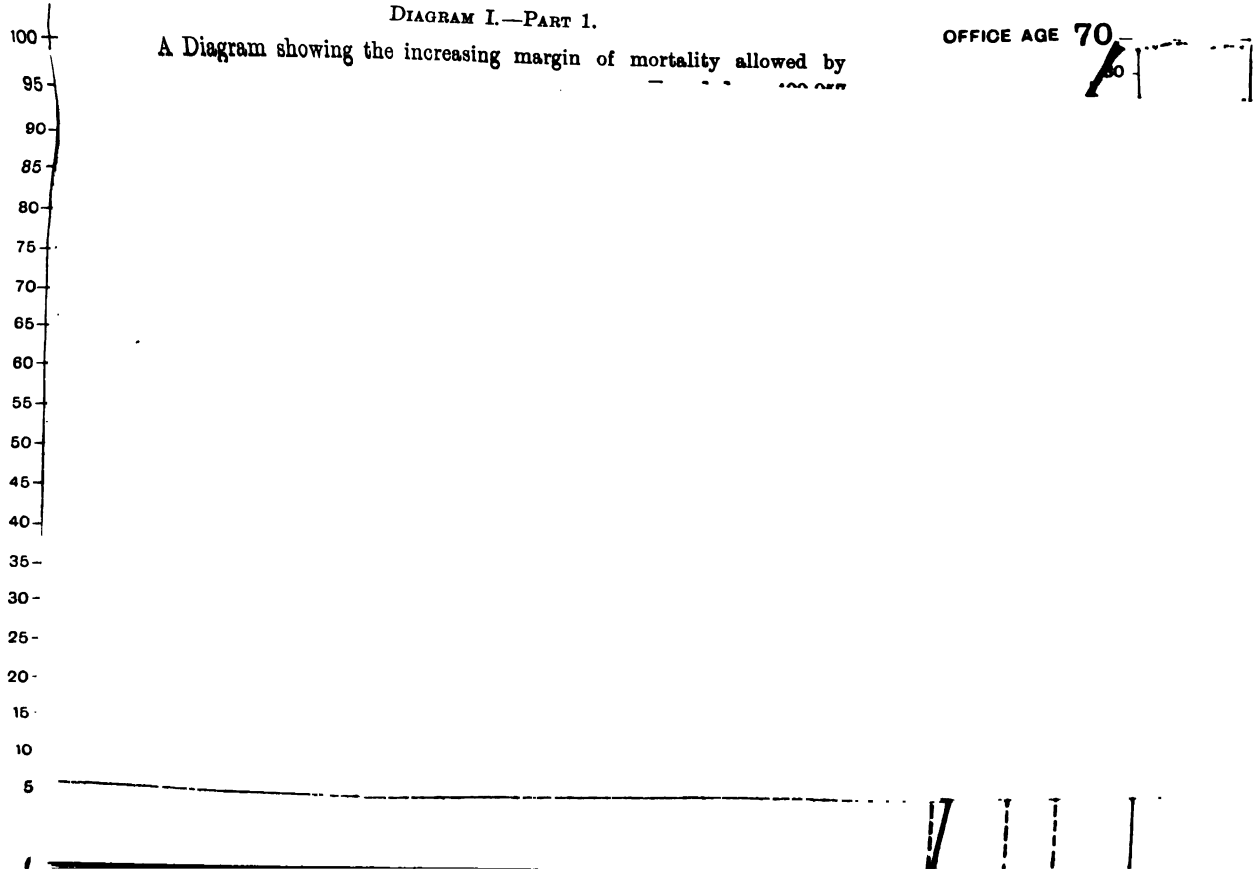


DIAGRAM I.—PART 1.

A Diagram showing the increasing margin of mortality allowed by

OFFICE AGE 70



PAPER

ON

"A GRAPHIC EXPRESSION OF EXTRA RISK AS IMPLIED BY AN ADDITION OF YEARS,"

BY

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Assistant Medical Officer of the Royal Exchange Assurance Corporation.

Read before the Life Assurance Medical Officers' Association on Nov. 6th, 1901.

The President, Dr. Theodore Williams, occupying the chair.

It is with many apologies that I venture to take up the time of the many experienced members of this Association with a few elementary considerations of a graphic expression of extra risk. In asking them to accompany me in a retrospective journey into the early problems which some of them may have found when they were beginning this work, it is with the object of showing my gratitude by demanding additional favours at their hands, for it is in their power to exhibit errors and to formulate my conclusions.

In commencing to deal with extra risks one finds a pleasing and unexpected degree of uniformity in the rating of under-average lives among the various offices. This in itself is presumptive evidence that our methods are correct, and the rules that are already in vogue are therefore very properly followed. But the suggestion

arises that similar acquiescence in precedent may be generally adopted. One recalls Disraeli's sweeping definition of a practical man as one who practises the errors of his predecessors, and the desire to test the matter becomes irresistible.

That the usual system is the true one for the greater number of the causes of extra risk I shall endeavour to show by a simple analytical method. It depends on a comparison of the graphic expression of the kind of extra risk which is presumed by an addition of years with an analysis of the normal probability of dying. The comparison seems to decide the question, and is, moreover, suggestive of interesting collateral considerations.

I have used the figures furnished in Dr. Tatham's supplementary report to the Registrar-General's Returns, of which excellent use has frequently been made in this room. Though not founded on Insurance experience they are convenient to serve the purpose of a merely illustrative paper.

The chief problem is to find out to what extent the method of adding to the age corresponds with the extra risk anticipated in a proposer by reason of his defects, using the word "defects" in a comprehensive sense.

I need scarcely say that one's early difficulties include that of dismissing all other ideas save this, that Life Assurance is a risk, and that an under-average life simply implies extra risk.

But if an under-average risk is acceptable at all the implication follows, that the proposer's chance of dying is, though greater than normal, yet sufficiently small and remote to be insurable. The addition of a certain number of years to cover the extra risk assumes in a broad way that the probability of dying at every age from the commencement is increased by an amount corresponding to the difference afforded by advancing that age the same number of years.

If then we devise a means of showing the curve made by the series of normal probabilities of dying, *i.e.* the normal mortality curve, in conjunction with the curve made by the whole series of rated up probabilities of dying, we shall be able to see at a glance the amount of extra risk anticipated at every age. In other words, so far as the diagram goes, we shall see the margin allowed for extra claims by the increased premiums charged.

For this purpose I have devised the accompanying scale, which is to be read thus: The proposer's real age is moved along the required number of years, and the anticipated extra risk thus inferred appears in red in the opening of the scale above his real age, and the subsequent extra risk at all ages beyond is also apparent. The scale which I pass round (Diag. I) is made with a pair of angular lines, approximating to curves, but drawn with the limited number of ordinates derived from the Table of occupied males in Dr. Tatham's Report. It of course presents the error due to the line joining the ordinate for each decennial period being straight and not corrected to a curve. I have also drawn a more detailed diagram founded on the 30 years combined experience of Insurance offices (Diag. II). This shows loadings of 3, 5, 7, 10, 15, 20, 25 and 30 years. But the simpler scale shows equally well, and in a roughly graphic way the increasing nature of the extra risk anticipated by the usual method. The different effects of small rating on old and young lives at entry are also well illustrated. These points are of course familiar to every member of the society, but for my own part this graphic expression enabled me to appreciate, more clearly than I had previously done, how considerable was the margin of mortality allowed in the later years of life by small ratings applied at the early ages at which assurance is most usually effected. On this wide margin depends the possibility of the claim experience of offices showing that an extra mortality arising from under-average lives in excess of that anticipated in the early years of insurance, may be compensated for

by a mortality in the late years less than is allowed in the margin. This would arise from a class of lives that go on being under-average for many years, with a tenacity worthy of a better purpose.

If the anticipated extra risk, however, should not be of an increasing tendency the method of meeting it by an addition of years can not reasonably apply.

Extra risks clearly present three possible tendencies. [1] (1) They may increase with age, resembling that we have just seen to be assumed by an addition of years; and if I may wander into a figure of speech, comparing the normal force of mortality to a snowball, then this kind of extra risk may be likened to the application to it of a second snowball, which, by increasing the bulk, widens its track, and causes a more rapid growth with every revolution. (2) They may be constant. Like a stone picked up by the original snowball, this may be a noticeable feature at first, but its weight, though still there, is apt to be lost sight of in the load of advancing years. This class might lead to error by being ignored in the older proposers. (3) They may decrease with age. Now, I must stretch my simile to help it out. This class may be likened to the addition of a load of liquid air to the snowball, for the larger the size, and the more rapid the growth of the original comparatively warm mass, the more rapidly will the addition be dissipated, until the accumulated snows of age cause it to evaporate altogether.

The question therefore becomes one of finding out whether the increasing extra risk, presumed by the method of rating up, corresponds to an increased probability of any particular modes of dying, and for this purpose we must analyse the normal mean probability of dying into its components. Accordingly I have drawn the

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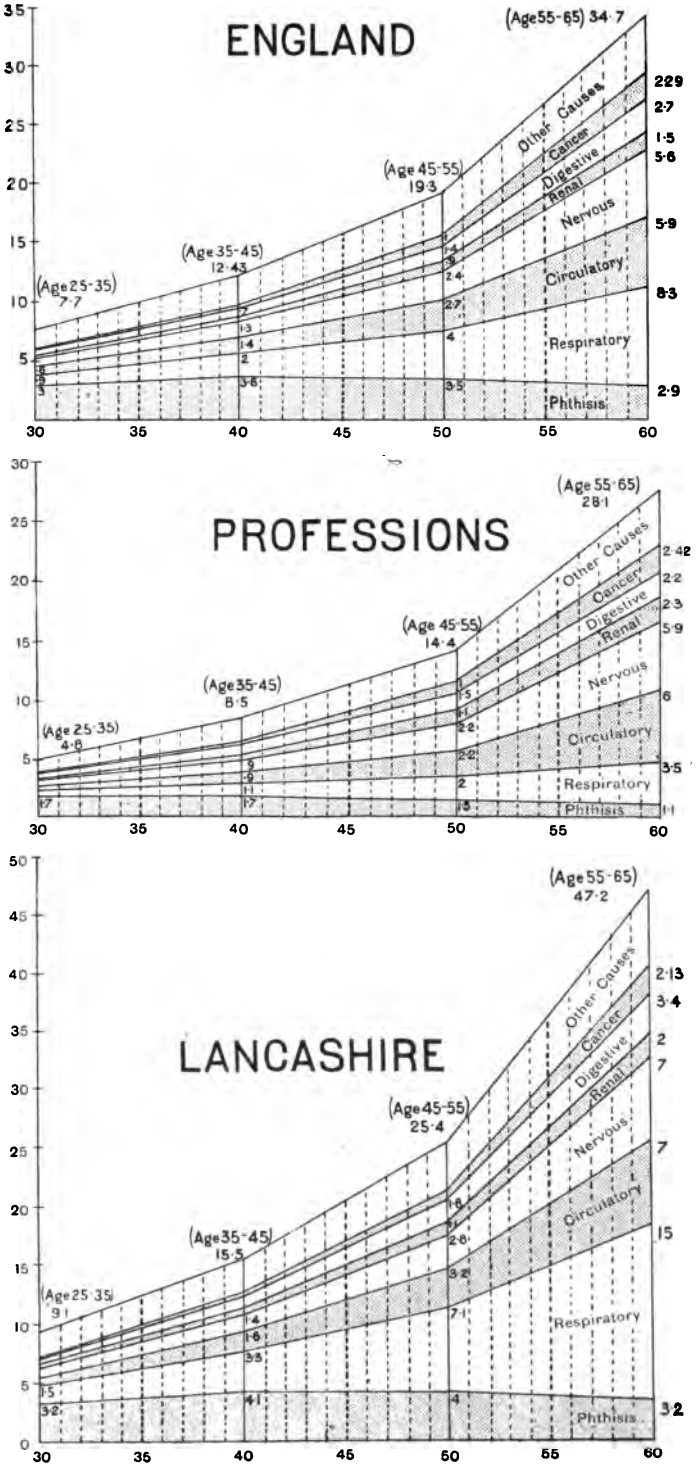
[1] *For an actuarial view of extra risk, vide Messrs. White and Whittall's Paper in the J.I.A. for 1884*



Sir Hugh Beevor's diagrams rearranged to show at a glance the constitution of the normal risk at any age. The risk at any age is built up of parts as shown.

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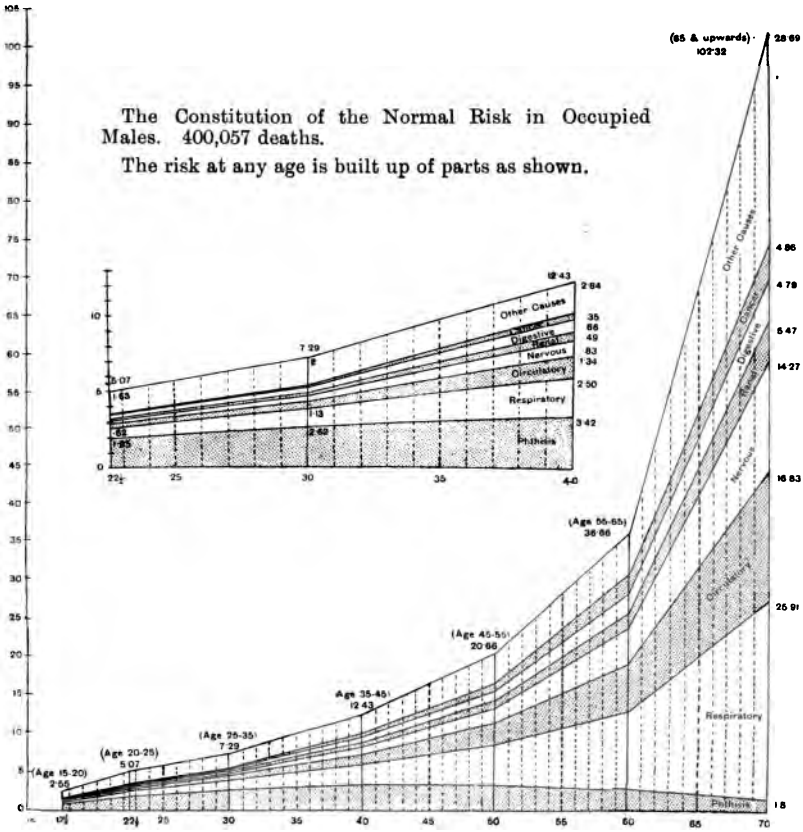

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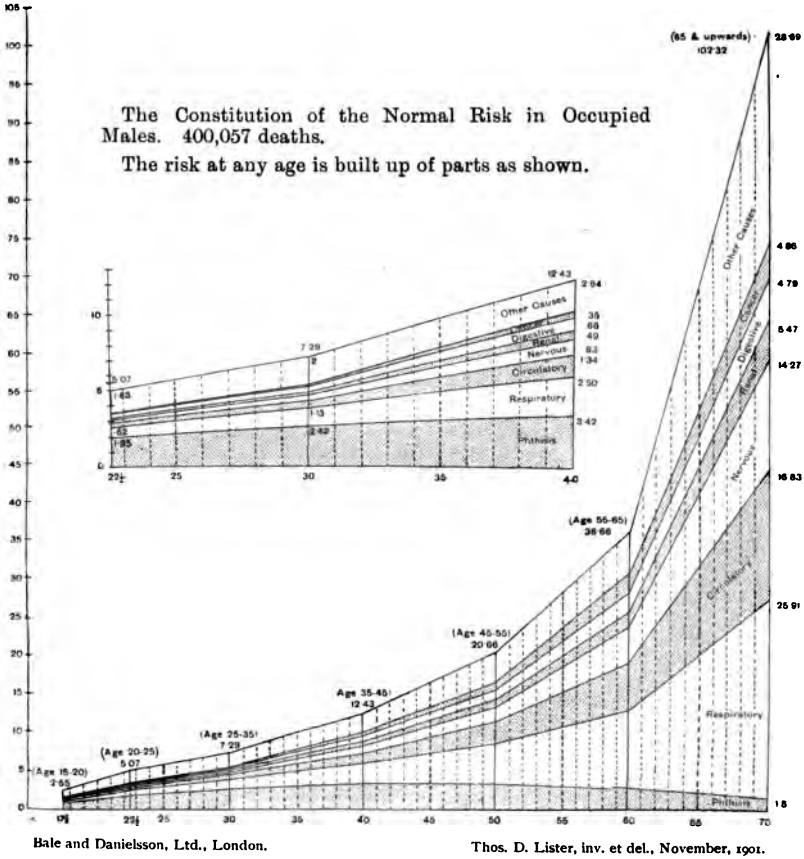

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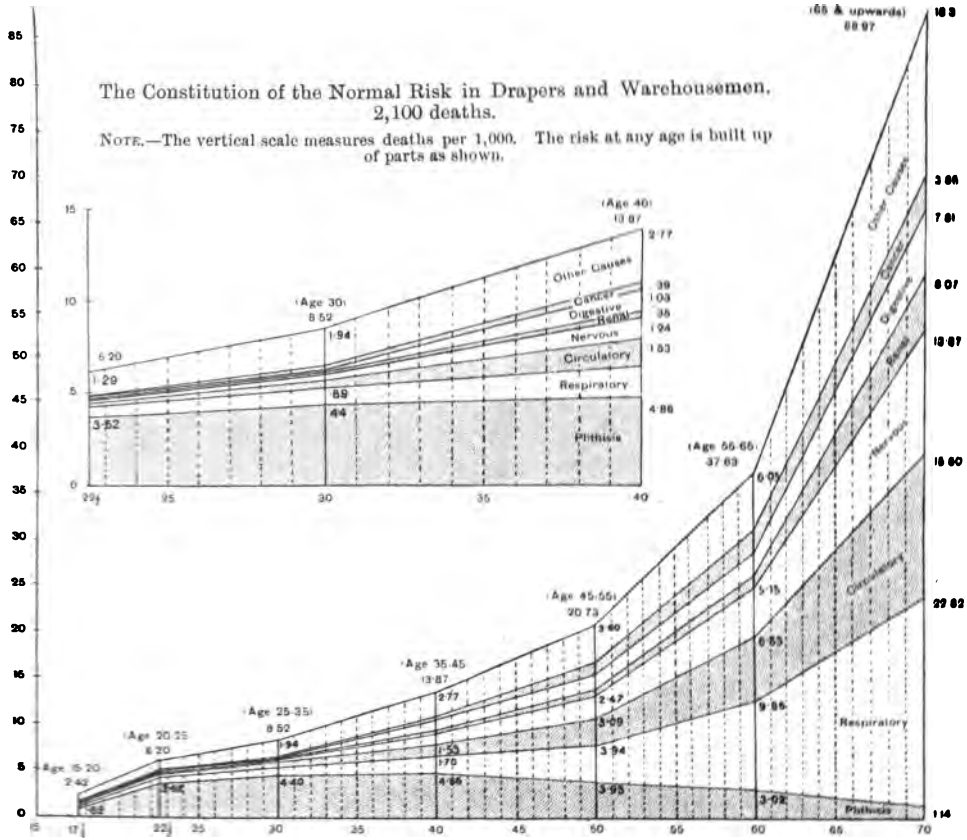

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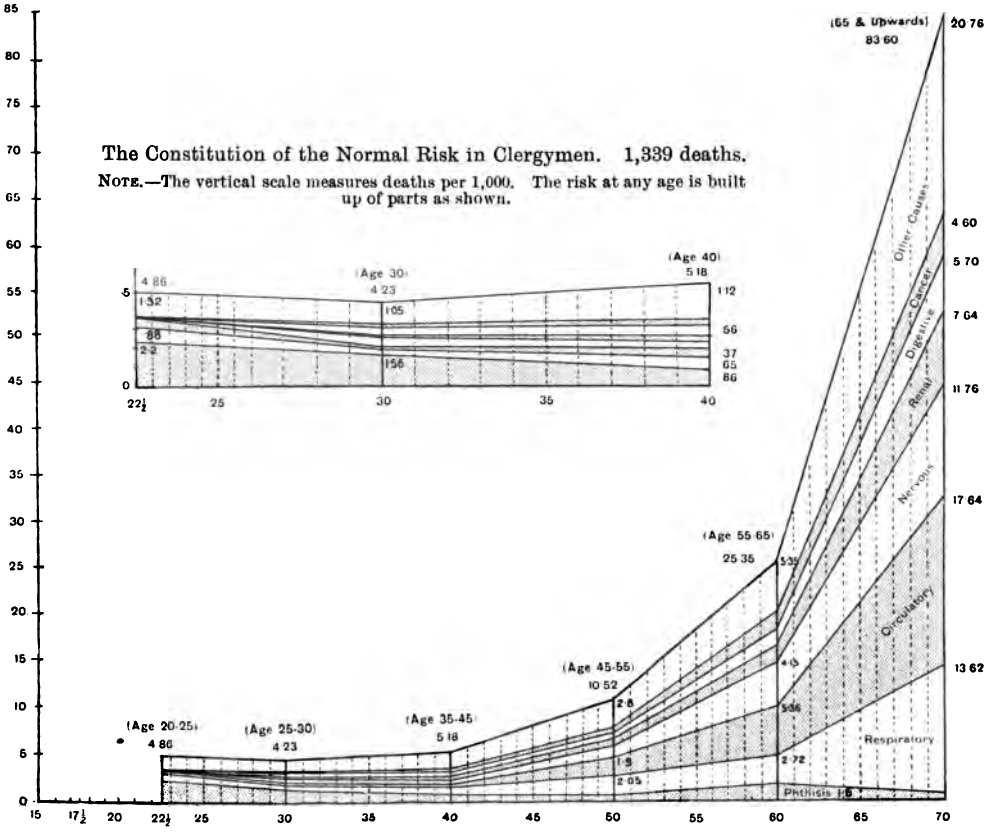

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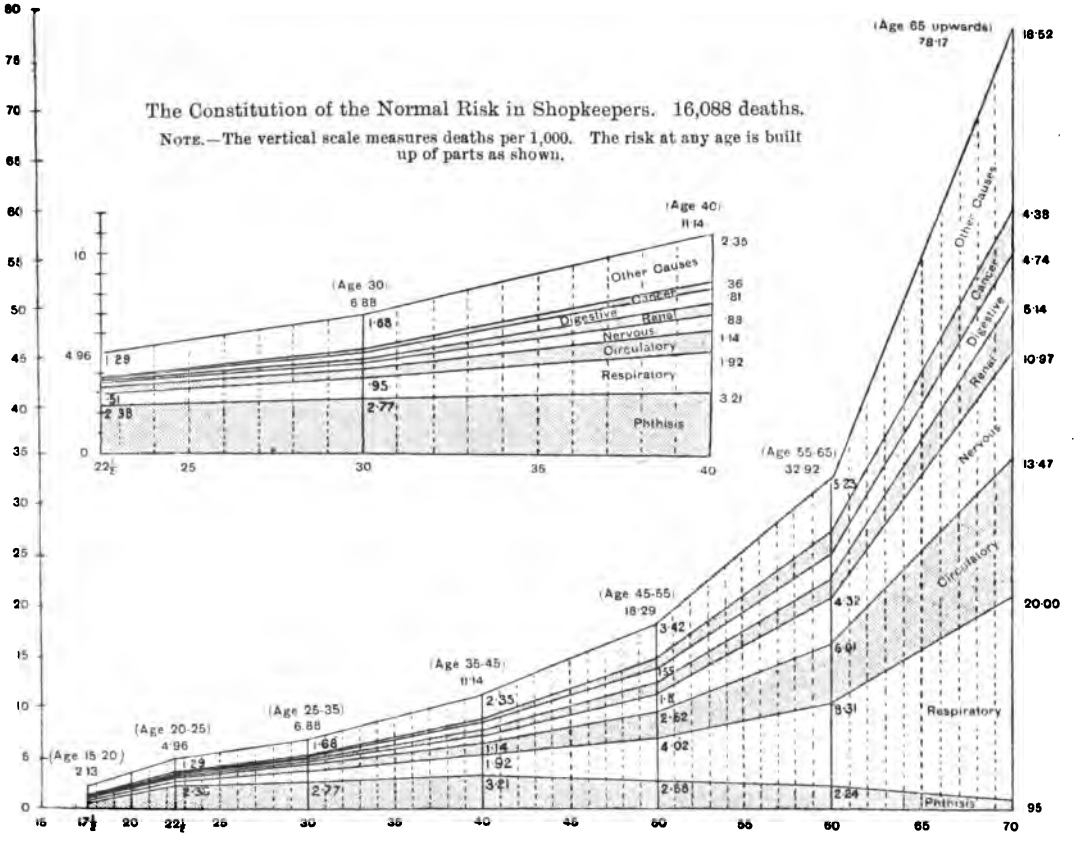

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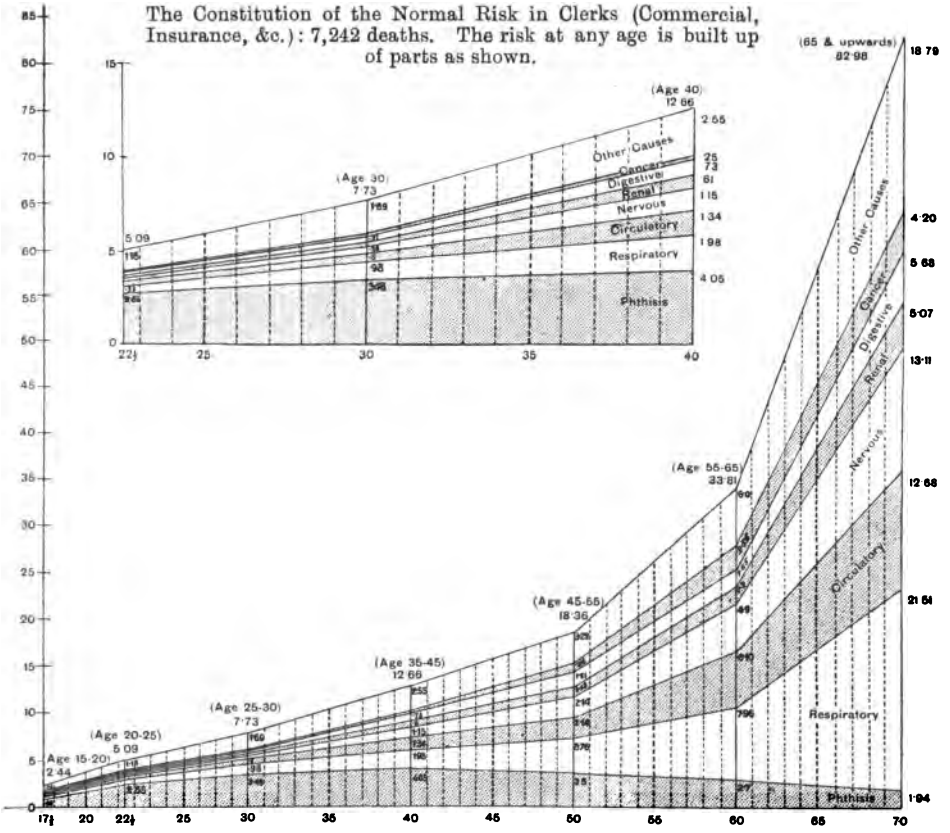
The Constitution of the Normal Risk in Clerks (Commercial, Insurance, &c.): 7,242 deaths. The risk at any age is built up of parts as shown.



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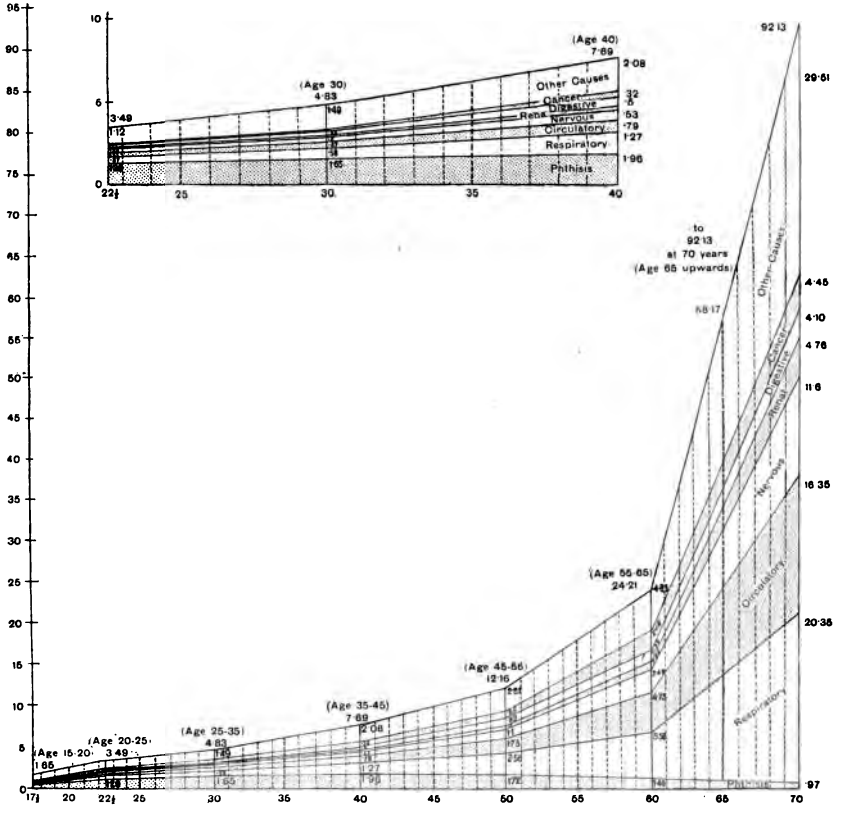
The Constitution of the Normal Risk in Agriculturists. 59,484 deaths. The risk at any age is built up of parts as shown.



Bale and Danielsson, Ltd., London. Thos. D. Lister, inv. et del., November, 1901.

accompanying tinted diagrams from the Registrar-General's Returns. For the many calculations involved I have to thank the actuary, Mr. Nightingale, and the staff of the office with which I am associated. You will recall the similar diagrams for which we were indebted to Sir Hugh Beevor, in which he showed how the death-rate was built up in four groups of the population. It was a re-arrangement of three of those tables in the way in which those before you are arranged which suggested the present comparison. I had taken his building blocks, and in the desire to grasp their full significance I made a stratified heap, against an imaginary wall at age 60.

The new ones that I have made for special occupations are drawn with a slightly larger number of ages, an ordinate being drawn from the mean age of each period of life given in the returns, and they are subdivided into eight groups of causes. At the bottom is phthisis, in violet, above it, in order, come respiratory diseases in green, circulatory diseases in red, nervous diseases in blue, the urinary group left uncoloured, the digestive group in green, cancer in violet, and the remainder in red includes plumbism, accident, suicide, influenza, alcoholism, rheumatic fever, gout, diabetes, and other causes not included in the other parts. The normal mean probability of dying from any particular group, at any age, in any occupation, is shown by the part of the ordinate from that age which lies within the group. The total mean probability of dying is thus analysed into its chief components at every age.

From these diagrams, which cover a good many of the occupations from which assured lives are selected, it appears that with the single exception of phthisis, and possibly some of those included with "other causes," the risk arising from any component invariably begins as a minute wedge that increases through life. An accentuation of any one or several of these component risks

would therefore induce an extra risk corresponding to that observed in a graphic expression of extra risk as implied by an addition of years. For it would be an increasing extra risk.

We are all accustomed to deal with increasing risks where the increase, at first gradual, is believed at a certain age and within a short period to undergo a sudden expansion beyond insurability. These I may call explosive extra risks, and they are only acceptable by methods which secure the office before the dangerous age. Within that age the extra risk can be dealt with in the ordinary way. In thinking of them it is better to think of this age as the age-incidence of the uninsurable extra risk, rather than as the age-incidence of the disease.

There are many interesting points about the occupation diagrams to which I should like to refer, but as they do not pertain to my subject, I will only notice that the respiratory group affords the greatest risk in old age in all the occupations except the professions, where vascular disorders predominate. Sir Hugh Beevor's diagrams show this, as well as the one that I have selected, that of the clergymen.

I do not think it is possible to conceive clinically or pathologically of a defective tendency in any of these great organic systems, which, if insurable, should affect the risk in an abnormal direction, and not become of more consequence with advancing age. For illustrative purposes the diagrams are the same as if derived from selected lives, for selection though it reduces mortality all round, does not prevent men dying of some method included in one of these eight groups. For practical application, if they have any, this absence of selection affords a margin of safety.

With a graphic expression and occupation diagrams we are able to compare the estimated extra risk at any age with the

normal risk arising from any of these groups of diseases, or from a combination of them. There might be a certain mental satisfaction in finding that our loading afforded a margin at 60 years of age of five times the normal respiratory risk, for instance, in the same class of proposer, or a margin perhaps equal to the maximum respiratory risk ever attained by the same class of proposer in the diagrams.

The question arises whether such diagrams could not be used in the opposite way. That is to say, first estimate the maximum insurable accentuation of the disease-group risk corresponding to the defects in the life, and the age at which it occurs, transfer the result to the corresponding age on a standard graphic expression, and finally read off the requisite number of years addition. This is a fascinating problem but one which requires a great deal of additional information to solve.

But for the sake of argument, I will stray into the thorny path of definitions, and say, that the estimation of the total extra risk in an under-average proposer may be defined as the formation of a judgment as to the excess percentage of such lives that will die as compared with average lives, at each age beyond entry.

And I would say that the estimation of the maximum insurable accentuation of a disease-group risk may be defined as the formation of a judgment as to the age beyond which the danger from that disease-group rapidly becomes uninsurable, but up to which the total extra risk can be estimated according to the preceding definition.

Under any such system of scientific loading as I have sketched, the art of estimating the extra risk remains, and eventually we should perhaps have taken a roundabout way instead of the direct route. But the diagrams, if one had time to discuss their respective constitutions, do bring out the comparative loadings that would be required in various occupations, for the same defects.

I have spoken of extra risk as being an accentuation of a part or parts of the whole normal risk. It is a convenient and, I think, accurate term, and I hope you will allow it, as I shall want it again. At any rate, it applies well to the large variety of extra risks arising in defective tendencies of the great organic systems.

The address by Sir Hermann Weber on Heredity in relation to Life Assurance, the papers and the discussions on Cancer by Dr. Payne, on Heart Disease by Dr. Williams, on Syphilis by Dr. Colcott Fox, on the Extra Ratings of Healthy Lives by Dr. Heron, on Overweight by Dr. Parkes-Weber, and others, afford numerous examples for our guidance in actual practice, and, with the single exception of phthisis, and possibly, some of the conditions included in "other causes," the addition of a number of years to the age at entry may be taken to accurately represent the expected course of the extra risk for most ways of dying, for they are increasing extra risks.

I have so far excluded phthisis. As a normal risk, we see that this forms in all occupations a broad band, only falling off in the extremes of life. Below 25 years of age it is mostly as big as all the others put together. Is the extra risk from phthisis to be taken as an accentuation of the normal risk, and therefore, only as a constant? That will depend on whether this risk is homogeneous, for if not, one part only might require accentuation. We say that the diagram of phthisis is normally almost a constant band. It is possible to imagine three ways in which such a band could be built up, its parts each maintaining a regular tendency. It could be homogeneous, it could consist of an increasing and a decreasing part, or it could consist of an increasing, a decreasing and a constant part. The latter of these is the most likely, and it possesses the advantage of grouping together the varied views that are so often expressed as to the proper way to deal with the varied risks of phthisis.

Clinically, in considering phthisis, we recognise infection, hereditary vulnerability, and late or early acquired vulnerability. These may be regarded as corresponding roughly to the supposed constant, decreasing and increasing parts of the normal phthisis risk. But if we regard the risk of infection as a constant, then we need only consider two kinds of extra risk, that induced by heredity, plus an increase in the constant risk of infection, and that induced by personal factors, plus the increased infection risk. That is to say a decreasing and an increasing extra risk from phthisis. Their combination, being an accentuation of the whole normal risk would form an example of a constant extra.

I may call your attention to facts brought out in the diagrams which to a certain extent illustrate the truth of this theoretical analysis. That of the publican and that of the draper and warehouseman are both bad as regards the normal phthisis risk. We have an article in our medical faith which says that alcoholism causes an increased liability to phthisis as well as to other diseases. We should imagine, therefore, that a trade which leads to the abuse of alcohol ought to give a worse showing in the later years of life when the alcohol has done its work than even one of the worst of the non-alcoholic trades. When we compare the diagrams we find that the draper at first in advance of the publican as regards his risk of phthisis is caught up about 44 years of age, and the bad pre-eminence of the publican's phthisis risk is indeed maintained to the end where it is double that of the draper. And another diagram, that of the clergymen—the best of lives in every sense,—shows a decreasing and an increasing phthisis risk meeting at the age 50, the downward dip of the phthisis band being the chief cause of a slight depression in the mortality curve at age 30 when all other causes of death are already increasing.

There seem to be both classes of phthisis risk therefore, and the accentuation of the increasing risk comes into the ordinary

method as shown by a graphic expression. There is a class of proposers, the relatives of those who have died of phthisis, a weakly class, who may be said to have a phthisical family history, because their family has also been weakly. These often require rating up on many grounds besides their increased phthisis risk, and this class seems to me to have led to some confusion. As phthisis is so often a factor in the estimation of an extra, an authoritative classification of the pure and mixed increasing and decreasing phthisis risks would be a great boon.

I will refer briefly to the examination of a graphic expression of extra risk to illustrate roughly the comparative premium addition for other kinds of policies than that in which premiums are payable throughout life.

Sometimes the premiums are limited in number, though the policy is for the whole of life. If there be extra risk involving a certain addition payable during the whole of life to meet it, and the payments of extra premiums are to cease long before the largest part of the anticipated extra risk appears in the graphic expression, the same premium addition would necessarily be insufficient and must be increased as the number of premiums is reduced. The comparative largeness of the normal premiums for limited payment policies is of no effect in covering extra risks.[2]

In a term Insurance on the other hand the office has no interest in the largest part of the extra risk which lies beyond the insured period. The premium addition therefore which would be required for a whole life policy would be excessive and must be reduced.

But in an endowment assurance there are two factors, the term insurance and the provision of the capital at the end of the term. The addition for the term-factor of an endowment assurance is the same as in a corresponding term assurance. But an extra

[2] *Dr. Pollock on limited payments, in the Medical Handbook.*

probability of dying involves a diminished chance of survival, and that part of the premium which is to provide the capital in the event of survival, is affected in the opposite way by an increased chance of death and its risk, so to speak, being diminished part of it can be applied to counterbalance the increased risk on the term part of the assurance. Hence the small addition on a term assurance is still less in an endowment. But only an insignificant extra risk of a very gradually increasing nature can warrant acceptance at average rates for a term or endowment policy.[3]

In regard to constant and decreasing extra risks which are not within the scope of a graphic expression of extra risk as it is implied by an addition of years, I would only say that they seem to be of frequent occurrence but of few varieties, that apart from phthisis, they are chiefly of an extrinsic origin, and that their authoritative grouping and treatment, including such as arise from phthisis, would be of great and constant interest and value.

In conclusion: The extra risk implied by an addition of years is an increasing extra risk. It corresponds to an accentuation of the normal risks from organic disease, but only to an accentuated phthisis risk when the normal risk of phthisis is analysed. Phthisis extra risks may be classified. An addition of years for constant and decreasing extra risks is a confusion of ideas. Constant and decreasing risks may be classified. They should be treated differently from increasing extra risks.[4]

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[3] *For an instructive series of figures illustrating these points, vide Messrs. White and Whittall's Paper. J.I.A., 1884.*

[4] For instance, a constant extra risk should apparently be met by an annual extra premium charged as a percentage on the sum assured. This would only cover the extra risk in its own year, and is obviously of a different application to the same sum charged by an addition of years. For in the latter case the presumption is that the extra premiums accumulate by repeated additions to meet the *increasing* extra risk assumed by the addition of years, whereas the *constant* extra risk requires a fixed extra charge to meet it in each year. In other words

These are very trifling conclusions to set before you, for they are necessarily familiar to you in everyday insurance practice, and are indeed merely revisional. But by bringing them before you in a group, I hope we shall obtain suggestions for the further use of graphic expressions, and for the classification of at any rate some of the special kinds of extra risks, according to the course of the risk and its appropriate treatment. For though proposers appear as individuals, it is our work to classify them for acceptance.

The possibility of extra risks of different tendencies, increasing, decreasing or constant, being associated in the same proposer is an additional theoretical complication. The weakly man who has had phthisical parents is an instance.

I feel that I have trespassed on your forbearance by departing in this elementary fashion from the type of essay dealing with the treatment of special instances. But it is the opening night of the session. We shall enjoy the privilege of hearing such subjects treated later on, and our pleasure will be the greater for having been deferred. The complexity of many of the problems involved in our special discussions is infinite, and the data on which a decision is to be formed in practice often most meagre. One may perhaps, therefore, venture on an analysis, but to deal with the treatment of special conditions is a different matter, and one which must remain the province of those possessing skill, judgment, and wide experience. For though in time our transactions will include increasingly useful diagrams, tables and rules, their only use must be to render this department of practice still more a science, but no less an art.

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the constant extra charge on a class of lives involving constant extra risk must be entirely used up by the constant annual excess of mortality (*i.e.* claims) which they provide, above the average. It seems to me that though the sums added by the two methods might be the same, they are of quite different values in covering extra risk. But this is such an actuarial question that it lies outside our consideration as an Association.

The CHAIRMAN: I am sure we are very much indebted to Dr. Lister for his very elaborate paper and his most interesting diagrams. They are so interesting and so elaborate that they require a great deal of study to master them, and I confess that the casual glance I have had of them has not aided me to fully grasp their meaning. But no doubt when they are published in the transactions I shall be able to better go into them.

Dr. HINGSTON FOX: By permission of the secretaries I have put on the wall a rough diagram which I had the honour of showing to the association on a former occasion, and which was constructed with the aid of an actuary, thinking it might be useful in connection with the subject before us to look again at the graphic representation, not of different forms of risk, but of different forms of policy. As medical officers, we have to deal with certain descriptions of policy which our actuaries put before us, and endeavour to see how far they meet different kinds of risk. The diagram represents a male life entering at the age of 21, and shows the approximate loss per cent. to the Company on death at various periods after entry, under different forms of policy. The abscissæ represent the years after entry, and the ordinates show the amount received in premiums with interest at 3½ per cent., the complementary portion of each ordinate showing the loss to the office. The curved lines signify the different forms of policy. Thus, the lower line is the ordinary whole life policy at tabular rates. On this policy, at a date between the thirtieth and thirty-fifth year after entry, the total amount has been paid up, and the policy becomes a gain to the office. The next line above represents an addition of seven years to the rating, an increased premium, and we see this becomes a gain much earlier than the other. Another line denotes a policy of limited premiums, the premiums being all paid

up in 20 years. We see a steady ascent up to 20 years, and after that, when there is only the interest on what has been paid to add on, the rate of ascent becomes much less. The line above this is an endowment policy payable 30 years after entry. In order to adapt these two policies to extra risk a three years' addition to tabular rates has been made in each case. The endowment policy becomes a gain a few years before the date of falling in. The remaining line indicates a contingent-debt policy, intended to show the working of that particular form of policy which begins with the subtraction of a considerable debt from the policy if it falls in within a year; the amount of that debt becoming less and less until, when the period of so-called expectation of life comes to an end, the debt is entirely cleared off, and the whole of the policy is paid on death, premiums at the ordinary rates having been charged the whole time.

With regard to the paper that Dr. Lister has read to us, it is so condensed and technical that I think most of us will feel that we shall have to study it rather carefully at leisure before attempting to discuss it. But I have much hope that it will form an important step towards a scientific knowledge of extra risks and how to deal with them. It is desirable that we should be able to classify the risks that come before us more fairly and scientifically than we do at present. I would suggest three divisions of extra risks, viz.:—Early Risks; General Risks; and Late Risks. I am not sure that "decreasing" and "increasing" meet the case so well as the terms I have used. I think Dr. Lister intimated that phthisis was almost the only decreasing risk. He said there might be some others but phthisis was the only important one.

Dr. LISTER: Extrinsic risks. An extrinsic risk would be such as arose for instance from the danger of typhoid fever to young officers in India.

Dr. HINGSTON FOX: There are I think several early risks of a different character. Besides phthisis, there are the extra risks which arise from family history apart from anything in the present condition or personal history for I think that we all recognise that family history has less and less importance as life goes on. Thus we not infrequently take men in middle age or later life, who are in good personal condition, but whose family history is very bad. They have lived on, and they have a good record, and the extra risk from family history becomes unimportant. Such a risk applies generally to the earlier part of adult life, and this is particularly so with regard to a family history of tuberculosis disease, diabetes and mental disease. A history of liability to death from a certain class of fevers is another early risk, and I have sometimes thought I have seen in a family a tendency to death from accident.

The PRESIDENT: Has the tendency to death from accident anything to do with alcoholism?

Dr. HINGSTON FOX: It may be so, but one has not much information. The cause is a matter of speculation. Then there is the family history showing simply early deaths of relatives in an undue proportion. All these it seems to me are early extra risks. I am not sure that epilepsy is not in many cases an early risk. One certainly sees instances of epilepsy which has come on in adolescence, which is not very severe, and which often passes away entirely in middle life, but there is until it does pass away always the risk of a fatal occurrence. Then I suggest that persons who are underweight have an extra risk which comes early. Very often if they escape any serious disease they become much stronger in later life. Then there are the deaths from acute infectious fevers, which are also mainly an early risk. With regard to the diagrams which Dr. Lister has shown, I think we may

easily misinterpret their importance from an insurance point of view. We are dealing with what seems to be a very small mortality in the earlier years, becoming much larger in later life. From an insurance point of view what happens in these later years is of little importance; the cases will die, and what they die of is not of so much consequence. But what is of great consequence is the deaths that occur during the earlier years and in middle life, and the fact that they are represented by very small mortalities may seem to indicate that they are not of much importance. Yet they bring great loss to the offices. Thus in the upper band in the diagram there are important causes included without distinction, such as accidents, suicides, and fevers, which are all early risks, and which are sources of loss in the early years of insurance.

Returning to my own diagram, I would enquire how far these different forms of policies are applicable to the three classes of risks alluded to. With regard to the early risks, the policy with a contingent debt or lien which diminishes year by year is the one especially adapted to cover these risks. I have had perhaps as much experience of this form of policy as any one of us, unless it be Dr. Light, but I cannot say that further observation since I brought the subject before this association some six years ago has entirely confirmed me in the favourable opinion I then expressed as to its applicability, excepting with regard to limited early risks. It is the only form of policy which attempts to meet with any fulness the special risk of phthisis, more especially phthisis with a bad family history—phthisis occurring in young life. I brought some records before the association in 1895, giving the history of families in whom certain members died of phthisis very early, and the rest lived to advanced ages. Where one can locate phthisis in this way in the early ages, put one's finger upon it and say

that the risk occurs then, and that there is very little risk afterwards, there is no doubt that this is a form of policy which is well adapted to safeguard the Office, and yet not bear heavily upon the assured. But where the risks continue later on, and one cannot say that the risk is so limited to early life, then the debt policy is not satisfactory. I should like to draw attention next to the limited payment policy, to which I think Dr. Lister was not very favourable—I do not quite know why. It seems to me the form of policy of all those in current use best adapted for ordinary cases of early risk. You have the whole of the premiums paid up within a limited time. If the subject dies during that period the loss to the office is considerably lessened. Then the endowment policy is one which is, I believe, rather largely used for the insurance of under-average lives, both in this country and in America. The actuaries sometimes object to our putting second-class lives into it, because it spoils their averages, and if there is any large proportion of such lives put in that department it injures its use for healthy persons. But it is an attractive form of policy where the risk is located late, as in the liability to gout, heart disease, renal disease, vascular weakness, premature age, and a variety of other sources of special risk which bear more especially upon later life. I think, however, that we ought to adhere to the rule not to put a second-class life into the endowment policy department without making some addition to the age, because there is very little scope for gain or compensation to the office. It is not the case, as it is with a whole life policy bearing an advanced premium, that those who do live to considerable ages, become a source of large profit to the office. It is impossible there can be any considerable profit on the endowment policies, because there is a fixed time at which they come to an end. Therefore, as they are calculated upon healthy lives, and there is

little or no compensatory gain to make up for those who drop out early, we ought not to put under-average lives into them without making an advance. I should be disposed to think that for general risks, which are neither specially early, nor specially late, our system of putting an advance upon the age is the best and most scientific which has been yet suggested.

Dr. Symes Thompson: Like the last speaker I feel that the paper is so technical and abstruse that I do not feel able to discuss it with any degree of accuracy on the lines laid down. It deals with a number of subjects of very real importance, and which we have constant opportunities of considering. Working at my insurance office to-day I had to deal with two lines of enquiry bearing upon this paper. I had two cases in which it was proposed to insure for a short term with the option of conversion into a life-long policy. This is a line of insurance which, although suited for healthy lives, appears to me to be particularly unsuitable for risky lives, and it so happened in the two instances which came before my notice to-day the risks were very considerable. In one case there was a history of hæmoptysis and a serious attack of illness in 1888, combined with a depreciated condition, though not very noticeable at the present moment. The medical man who had examined the case and reported it to the office considered it was a first-class life and recommended it at ordinary rates, but the history seemed to render it unsuited for that particular line of insurance, and I recommended instead insurance in the endowment class or on the limited payment system. I could not recommend it under the system proposed. The other case was even of a worse kind, one in which family history, weight in proportion to height, and general appearance all seemed to indicate an extra degree of susceptibility rendering such a class of insurance undesirable. Another case which came under my notice

was in connection with one of the American offices, where the plan adopted is to make such a debt upon the policy that no payment at all is made in the event of death occurring within the first year, but if the candidate lives for the first year then a certain proportion becomes payable and with every annual payment a larger proportion of the original sum becomes payable, so that the whole sum insured is eventually met. That is a method of insurance not popular with the English offices, but it certainly makes it possible to insure even the very worst lives. I find that one of the American offices issues a very elaborate table based upon an immense mass of figures showing the mortality which has accrued in cases, for instance, of mitral constriction, aortic regurgitant disease, diabetes, and so on, and in one table there was a combination of the two evils, the co-existence of diabetes and aortic regurgitant disease. We, representing the English offices, should hardly be able to quote illustrations of the course of events in such cases as these, because I imagine we should scarcely recommend a case of aortic disease, or still less of mitral constriction together with saccharine urine, but in the American offices, where these risks are met in the way I have described, they are able to give us interesting records as to the course of events. I think as regards the subject before us we must allow that these special methods permit us to meet special risks. With regard to the statement of the author that the tables give the same result whether the mortality occurred early in life or late in life (that the same table had a bearing), I think we are accustomed in reporting on cases to bear in mind the fact that whilst in one case the risk is immediate in the next few years, and in another case the risk is delayed but increases in times to come, we still have the same convenient method of adding a few years to the insurance so as to meet the extra risk. In one case the extra

rating is a way of meeting the risk in the immediate future, and in the other case the extra rating is a means of diminishing the risk in the later periods of life. It is so convenient to add a number of years that we cannot make any difference in our methods of dealing with these two classes of risk. As Dr. Hingston Fox has so truly said, the endowment policy is particularly suited for those risks which occur after 15 or 20 years, and the limited payment system is particularly suited for those cases in which the risk is speedy. I suppose in many of our offices we adopt the system of limiting the payments to 10 or 12 years. A single payment diminishes the risk to the office, but even so the risk is very considerable if the candidates die in the course of a year or two. All these points seem to be suggested by the paper before us, and they will be certainly of value to us when we come calmly and carefully to read the paper in the Transactions.

Sir Douglas Powell: I think this paper is a very valuable one, and will be appreciated much more by us when it has been published and we have had a good time to devote to each of the particular tables. I doubt, however, whether there are many in this room who are at all competent to criticise it to-night. Speaking for myself, it seems to me to be a paper which is much more fitted to be read before the Institute of Actuaries than before this Society, because the details are almost actuarial tables. It deals more with the calculations of the risks to the insurance office than with those causes which diminish the tenure of life in each individual. Therefore, I frankly confess I am quite unable to speak to the paper, because I do not understand it. There are one or two points touched upon in the course of the discussion by Dr. Hingston Fox and Dr. Symes Thompson, which I should like to refer to. First, with regard to endowment policies. I most thoroughly agree with what was

stated by Dr. Hingston Fox, that endowment policies require addition, in cases of unsound lives, proportionally as much as ordinary policies. An endowment policy is calculated from a healthy life, and if it is an unhealthy life, no matter whether the risk comes late or early, it is a damaged life for insurance, and the only and proper way to consider such a life is to consider it with regard to the addition that would be required, treating it as an ordinary life. Then it is a matter for actuarial calculation as to what addition is required for the life on the endowment policy on the same lines. With regard to the debt policies which Dr. Hingston Fox advocated some time ago, I was rather glad to find he was a little weakening on that subject consequent on his further experience. I have no sympathy whatever with debt policies, and I do not like the principle which they seem to involve, a sort of "heads I win, tails you lose," with regard to the person who comes for the insurance. It is a kind of fine for the man who has the misfortune to die early. He does not want to die early. I think, that if he once enters upon the books of the society, whenever he dies his assigns ought to have the benefit of the misfortune which has terminated his life. I think it is for the medical officers to estimate that life, at the time it comes before them, and to take it or leave it. Of course, if the applicant thoroughly understands the debt policy, well and good; but I do not think that applicants do understand these things thoroughly, and therefore I have never been able to look upon that debt policy system as quite a fair one in life assurance, and I have always had a great prejudice against it, although I daresay it is a very unworthy prejudice.

Dr. de Havilland Hall: Sir Douglas Powell has given utterance to the sentiments which I intended to mention, that I am quite unable to discuss by far the larger part of the

paper, so ably put before us by Dr. Lister. There is one fact, however, that impressed me, a practical thing I glean from the paper, and that is the comparison of the risk in phthisis to the warehouseman and the publican. I think really that may be of a certain amount of advantage in the practice of life assurance, viz., that whereas there is an increasing risk to the warehouseman up to the age of 40, there is a diminishing risk after that age, but in the case of the publican the risk is greater after 40 and goes on increasing for some years. The publican coming for insurance between 25 and 35 would require to be treated rather more severely for his risk in regard to phthisis, quite irrespective of the drink question, than would the warehouseman. I was very much interested to hear Dr. Hingston Fox refer to the debt policy. When he brought it forward six years ago I was opposed to it, but I have had some little experience since then, and I find it of use. A man has been rated up for 7 or 10 years for some family history; he grumbles about it, and thinks it most unfair; and I have suggested to the actuary that the man should back his own life by having a debt on his policy. So far from people not understanding, I think those who come to insurances offices are very sharp, and seem to thoroughly well know the ins and outs of the whole matter.

Dr. Glover Lyon: Do they take them up?

Dr. de Havilland Hall: Yes; not infrequently a man who has refused to pay any addition will accept a debt on his policy, and that, I think, is a reasonable way of meeting the case. It is better for the office to have the addition for the whole life, but in the keen competition of the present day agents sometimes are very desirous of not losing a particularly useful man who will help them in their canvassing, and this can be met by putting a debt on his policy. On several occasions

this has actually taken place in my experience. I quite agree that, as a rule, when an endowment policy is granted to an under-average life, there should be an addition, and I have always insisted upon it; but there seems to me a class of case in which you may rightly insist on a man taking out an endowment policy without demanding an addition—the case, for instance, of a man of perfectly good physical condition, living a healthy life, but whose family history shows an early breaking-down strain, his father, mother, uncles, or aunts dying from 55 to 65. If a man of 25 insures, he might be safely granted an endowment policy at 50 or 55.

Sir DOUGLAS POWELL: You mean at ordinary rates?

Dr. DE HAVILLAND HALL: Yes; those are the only cases in which I think an endowment policy can be accorded ordinarily for what is a damaged life. If a man of this tendency requires a whole life assurance, there must be an addition to his policy; but he may be taken on endowment, say, at 10 years at ordinary rates. I do think the endowment policy, at a fairly early age, is very useful in cases of those inclined to obesity. I am hammering into my Directors that the obese candidate for insurance is not a desirable risk, and that he must be taken (if he is taken) with an addition or with an early endowment. The limited number of payments is a form of addition which was earliest in vogue in my office. Looking back into the records, I think that the first condition made was to insist upon the terms being paid up in a limited number of premiums. It is only in comparatively recent years, in the last 20 years that other forms of addition have been made. Judging from the past, those limited number of premiums have been exceedingly successful. Of all the forms used in my office, the limited number of premiums have turned out best to the Company.

Dr. NEWTON PITT: I agree with the previous speakers in regretting that it was not possible for Dr. Lister to have his tables printed and sent round before the meeting in order that we might have an opportunity of studying them, because it is quite impossible to criticise at a moment's notice, tables which have been drawn up with considerable care and which are so elaborate. I hope that the question may again come up in some form or other when the tables may be more fully discussed. I am of opinion that a mistake is often made, in taking second-rate lives at a normal rate, under an endowment policy, which would have been rated up for a whole term policy. The tables are calculated for first-class lives, to yield a fair profit, and to put a second-class life on an equality with a good one, under this table, is to unduly favour it. It is a question even, whether they should not be accepted with the same additional number of years to their age, as would meet the extra risk for the whole of life, rather than be let off scot free. Some of the rated-up lives for the whole of life, such as those with a tuberculous family history may, when they have survived their early period of liability, prove to be better than the average and bring in a large profit to the Company. No such large profit is possible with an endowment assurance. An addition of seven years to the age of a young life, for an assurance for the whole term of life, may, should the life live to a good age bring in a large profit. An addition of seven years to the age for a short term endowment brings in but little, and if the amount of money at risk in an endowment policy were considered separately, we should often realise that a sufficient addition was not being made. With regard to the principle of the debt policy, a considerable number of policies are taken out for the payment of the death duties for the renewal of losses, and for various conditions under which it is essential that a

definite sum should be at hand: and in many family arrangements, it is very undesirable that the amount of money which will be at disposal, should be variable and not definitely known. For such purposes undoubtedly these policies are unsatisfactory. After all, supposing a life does not die within the first ten years, the loss to the office is not very great. The difference in such case, between the loss on an ordinary policy, and that shown, for instance, on Dr. Hingston Fox's table, is not great. Should the life die within the first five or ten years, the loss to the office must in either case be serious. What is essential, is to avoid taking lives which die within the first five years, but if through a failure in judgment, you accept a life that dies early, it is not very important to the office whether they save 5, 10 or even 15 per cent. of their loss by having devised some particular scheme. The important thing is to avoid accepting such lives.

Dr. Hingston Fox: Do I understand that we ought to make reduction up to 30 or 40 per cent.?

Dr. Glover Lyon said he was in the habit, in the case of an endowment policy when the life was under average, of recommending such addition as would apply to a whole life policy, the actuary thus adjusted the extra to the endowment policy in question. He believed that if all the deaths from senile phthisis were properly registered, the registered mortality from phthisis would increase right up to the end of life, as is the case in New York. It should be remembered that in a contagious disease like phthisis, although the mortality, according to groups of persons, might decrease in succeeding age periods, it did not follow that the risk of phthisis in any particular person diminished, for if the susceptibility remained constant through life, those most liable would succumb first, leaving a group of less susceptible subjects.

Indeed, he thought now, as he had expressed some ten years ago, that the phthisis curve in England is best explained by a combination of the antagonistic forces of increase of individual susceptibility with the decrease of group susceptibility due to survival of the least susceptible. The diminution of mortality after 60 he believed to be due entirely to false certification.

The paper had been useful in bringing to mind how very few cases of diminishing extra risk really existed.

Sir Hugh Beevor: I am very glad to find that my seniors, like myself, cannot gauge this paper. It seems to me there is much substance in it. The discussion has been very largely upon the form of policies which should be taken out to meet risks. I thought the tendency of Dr. Lister's paper was to leave that all aside, to leave it entirely to the actuaries, and that he hoped to simplify our modes of procedure, not, as Sir Douglas Powell said, by the simple custom of considering what addition is required to an ordinary life, but by simply finding out what number die per annum. I think his view was that it would be simpler for us if we first took things from that point of view rather than from the point of view we are taking now by considering at once the addition which will be necessary. This paper has many things which to my mind should come before us as subjects of separate papers. Such is the question whether extra risks can be sub-divided into those which are increasing with age, those which are constant and can be ignored in old age, and those which are diminishing, and whether such a statement in the ordinary way could be handed in with our report so that an actuary could make use of it. The diagrams will be of great advantage.

Dr. T. D. Lister, in reply, said: I have to thank you for the discussion which has taken place on this paper. Sir Hugh

Beevor has expressed in a very few words what was the chief matter of my paper, the sub-division of extra risks, and that we should deal with them by estimating the extra mortality to be expected in a class of similar proposers rather than by estimating the individual expectation of life, with all the errors to which it is liable. Dr. Hingston Fox recommended very strongly the contingent debt policy. What is a contingent debt policy? It means that when a man has insured, instead of being insured for £100 in the first year he is only insured, say, for £60, that is to say, he is paying a premium for £100 on a £60 insurance, and therefore he is charged a very heavy addition to his premium for the first year. In the second year if we have a decreasing contingent debt, he has to pay a less extra premium, and so on. In that way you are merely charging a decreasing extra premium for the decreasing extra risk which you anticipate in the proposer. Therefore, a decreasing contingent debt policy has no primary effect at all in regard to covering increasing risks, or constant risks; it only acts in a sort of way as a cover for decreasing extra risks, a question with which I did not deal in my paper. My paper pointed out the comparison between increasing extra risks and the increasing mortality of the ordinary modes of dying, including some cases of phthisis. I said I should be very glad if we could get phthisis risks classified and tabulated, and no doubt the decreasing contingent debt policy is a good way of dealing with decreasing phthisis risks, because it is charging a decreasing extra premium for the first few years. But its result, if death occurs from any other cause than phthisis, is the payment of a smaller sum than the face value of the policy. This should be made clear to the proposer, unless death from phthisis alone should be made the condition of reduction. In the latter case, a temptation to errors in diagnosis would certainly arise. With regard to the classifica-

tion of extra risk, I think that early, general, and late, are almost equivalent terms to decreasing, constant, and increasing extra risks. In speaking of family history and early deaths, we are raising the question of critical periods in life and breaking down ages. These were included in the class of extra risks I spoke of as explosive increasing extra risks, where at certain ages the risk is supposed to run up to a point beyond insurability. If we include this age we should have to apply an appropriate loading. I have to thank Dr. Hingston Fox very much for supplying the supplementary diagram, which puts into premium form the considerations which I have made from the point of view of extra risk alone. Dr. Symes Thompson called attention to the kind of policy which provides a term insurance for a few years, and afterwards allows the option to the proposer of going on without further medical examination, so that a very strong element of selection against the office is introduced. That class of policy, as he pointed out, is particularly unsuitable for unhealthy lives, as the office takes the whole risk, and if there be any defective tendency in the proposer at all, a C 2 table, or a table allowing the proposer the option, after a certain number of years, to go on without medical re-examination, is a very bad policy. He pointed out also that the contingent debt policy was very good if the proposer understood it, a statement with which I fully agree. In regard to limited payment whole life policies, the information afforded by Dr. Hingston Fox's diagram, is very incomplete, but as far as I can gather from the actuaries the addition of premiums that should be made for decreasing extra risk is twice as great in the limited payment policy as it is in the whole life policy, though that, of course, varies with the age at which the limited payment policy is effected. If one supposes a decreasing risk, that may be finished at the age of 60, but is very large at the age of 21, it gradually diminishes,

coming close up to the normal curve as we get towards the end of life. Therefore the extra premium charged in earlier years of life will have to be very much greater than the extra premium charged in later years of life for a class of decreasing risks.

Dr. GLOVER LYON: What would be a class of decreasing extra risks?

Dr. LISTER: Such cases as simple family history of phthisis in otherwise good lives, and the lives of young army officers in India. Sir Douglas Powell seemed to think I should have tried my paper on an audience of actuaries. He suggested that I should have considered the nature of normal risks as they exist in individuals. So far as I could see, the very foundation of my paper was such an analysis of the risks in the normal proposers as they come before us. I am quite in accordance with the views expressed by Sir Douglas Powell and other speakers, that endowment policies require their appropriate addition as much as whole life policies require theirs. If you have a risk which is going to run an increasing course through the whole of life, that extra risk has to be counted in the endowment period; but if the risk is going to run with an explosive tendency, then a very much less addition would be sufficient for a term or endowment assurance than would be necessary for a whole life policy. I think I tried to show that in my paper. It is no doubt also a very excellent plan to refer the policy to the actuary after calculating the risk for the whole life. Dr. Hall pointed to the facts I mentioned as to the comparative phthisis list of the publican and draper, namely, that the publicans' extra risk crosses the drapers' at about the age of 44, so that at the latter years of life the publicans' risk is twice as great as the drapers'. I drew attention to those facts

to illustrate my point that there seems to be both an increasing and decreasing phthisis risk. I also suggested in my paper that a comparison of these diagrams gives us a very good inference as to comparative loading for the same defect in different occupations. If we had a set of diagrams for all the ordinary insuring occupations that come before us we should be able to deduce the comparative loading for the same defects in different occupations. Dr. Hall stated that the limited payment policy has been very successful in his office in compensating for extra risk.

DR. DE HAVILLAND HALL: I said to meet special cases where men objected to paying extra.

DR. LISTER: That is to say to compensate for extra risk. Even if it were true, which it is not, it is difficult to see on first principles, how a set of premiums, which exactly corresponds actually to the whole life premiums devised to meet the normal mortality occurring all through life, can compensate for any extra risk whatever. As I said before, in the very cases where the limited payment policy is most usually adopted, that is in decreasing extra risks, a limited payment policy requires a much larger premium addition than a whole life policy. Dr. Pitt has done some work on the relation between the term and endowment factors of an endowment insurance. I alluded to these factors in my paper. The term factor does not cover the contingency of death beyond the period, but it provides fully for that contingency during the period. The other part of the endowment premium provides for the payment of a sum in the event of survival. Since the death risk is fully covered by the term part of the total endowment premium, loadings which are adequate for term insurances are too large for endowment policies. For part of that factor which was only to provide for the pure survival contingency

which is diminished, can now be applied to cover the increased risk of death of the pure term insurance. Dr. Glover Lyon also agreed that the loading in endowment policy is a matter that can be safely left to the actuary when we know what the whole life loading should be, but sometimes we have to examine a large number of papers and we have among them, proposers who are asking for endowment and term insurance, and we have to judge what the loading should be in sending them down to the actuary. From a graphic expression we can deduce roughly what the appropriate loading should be. Then he referred to deaths from phthisis in old patients. In my opinion the slight falling off one observes in extreme age is due to the inclusion of some cases of phthisis with the other respiratory diseases which form such a large mass of deaths in old age. In cases of senile emphysema and bronchitis, one often has a great difficulty in diagnosing tubercular infection clinically, and therefore an error may often creep in at these old ages where the phthisis risks seem to fall off. For practical purposes one may presume that phthisis is really a constant band almost throughout.

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